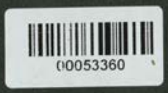
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METEOROLOGICAL
OFFICIAL No 321
OFFICE

METEOROLOGY
OF THE
NORTH ATLANTIC
DURING AUGUST 1873
ILLUSTRATING THE HURRICANE
OF THAT MONTH.

Official No. 32.

THE

METEOROLOGY

OF

THE NORTH ATLANTIC

During August 1873.

By CAPTAIN HENRY TOYNBEE.

ILLUSTRATED BY DAILY CHARTS

Showing the Rise and Progress of the Hurricane which did so much Damage in Nova Scotia and its Neighbourhood on the 25th August, as well as the Normal State of Wind and Weather in that Month.

53360

Prepared under the Authority of the late Meteorological Committee.

LONDON:
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE,
AND SOLD BY
J. D. POTTER, 31, POULTRY; AND EDWARD STANFORD, 55, CHARING CROSS.

1878.

Price, with Book of Charts, Fifteen Shillings.

00053360

PREFACE.

In the month of December 1873 the Meteorological Committee received an application from Captain Toynbee for permission to collect information from ships' logs illustrating the history of the destructive hurricane which had visited the coasts of Nova Scotia and Newfoundland in August of that year. The permission was accorded, no less than 280 logs have been collected and examined, and the results of the discussion are contained in the following pages.

The Meteorological Council have authorised the present publication as a remainder of the work of their predecessors. It cannot be doubted that more work of the same nature as that here submitted would throw light on the atmospherical conditions which influence and determine the weather in the West of Europe.

ROBERT H. SCOTT,
Secretary to the Council.

June 1878.

A. 76. Wt. H 463.

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ERRATA.

Page.	Par.	Line.	
11	3	5	Cut out last part of paragraph from "No. 231" to end.
13	3	3	For "winds" read "wind."
20	last.	1	For "neighbourhod" read "neighbourhood."
24	last.	1	For "60° W." read "60° N."
29	1	1	Cut out "central."
32	9	1	For "variable" read "from various quarters."
33	last.	2	For "sometimes" read "in some places."
41	5	1	Give hyphen between "hove" and "to" thus "hove-to."
42	6	1	For "variable" read "from various quarters."
45	3	3	For "Wd." read "Ed."

ERRATA FOR CHARTS.

Date of Chart.	Ship's Number.	Position.	
6th	233	Plymouth	Instead of 233 read 239.
24th	77	29° 35′ N. 77° 43′ W.	This ship's latitude was really 32° 35′ N.

THE

METEOROLOGY OF THE NORTH ATLANTIC

DURING AUGUST 1873.

INTRODUCTORY REMARKS.

MANY useful researches have been made on the subject of Storms, and Charts have been constructed from the observations of ships, showing the positions and tracks of special gales. From such works very valuable results have been deduced, for much has been learnt from them with reference to the parts of the sea where hurricanes originate; the various tracks in which hurricanes generally travel; the facts that winds from all points of the compass are blowing at the same time in a hurricane, and that those winds are drawn more or less directly towards a central area of very low pressure where there is a calm.

From this knowledge useful rules have been drawn up for the guidance of navigators, but they are incomplete, and there is a growing desire to know more as to the origin of storms, as well as what is going on within and around them during the time that they are blowing. Such work needs simultaneous observations over a large extent of the earth's surface; and although complete records of the kind are not yet available, especially with regard to trustworthy instrumental observations, the Meteorological Committee of the Royal Society decided, in December 1873, to try what could be done with existing data, to illustrate the normal winds and weather over the N. Atlantic in August 1873, as well as the origin and progress of the hurricane which blew in that month, and did so much damage in Nova Scotia and its neighbourhood.*

For this purpose the logs of ships in the North Atlantic have been collected from all available sources, and the daily observations corresponding as nearly as possible to 0h. 43m. p.m.,† Greenwich time, have been selected from them. The names of those gentlemen who have furnished information will be found in Appendix A., and the Office would here express its most sincere thanks for the very valuable assistance which they have rendered.

The observations are plotted on Daily Charts, and a full explanation of the method followed is given on each Chart. When two or more observations were taken in nearly the same spot, those which could not be represented in position are given in one of the lower corners of the Chart, a symbol of reference being given at the ship's position.

In the case of sea observations, each arrow is accompanied by the number of the log,

* Dr. Meldrum, F.R.S., has commenced similar work for the Southern Indian Ocean, see his "Notes on the Form of Cyclones in the Southern Indian Ocean," published by this Office. Messrs. Blanford, Willson, and Elliot, Meteorological reporters to the Government of India and Bengal, have also published valuable reports on cyclones in the Bay of Bengal.

† This time has been taken because it agrees with 7h. 35m. a.m., Washington time, which is one of the three hours selected for observations over America. When an observation is not within an hour of 0.43 p.m., Greenwich time, the actual *Greenwich* time is entered on the Chart near the wind arrow.

[A. 76. Wt. 3720.

which enables the reader to refer to the actual meteorological data given in a tabular form in Appendix A.* Frequently when two or more ships' observations are near the same spot in the vicinity of land, a mean result has been plotted and the first ship's number affixed to the arrow, but on referring to that number in Appendix A. reference will be found to the observations of other ships which have assisted in forming the mean. The original data used for the land observations can be found in the publications of the respective countries; anything important in the state of the weather on land has been made the subject of a remark. An exception has been made in the case of St. Louis, a French settlement on the Senegal, because it lies in the important area of low pressure near the Cape Verds. Unfortunately this station has no observation at the exact time of the Charts, so that those of 11 a.m. and 2 p.m. G. T. have been combined. The observations of both these hours are given in the daily records in Appendix A., they follow the observations from ships. The names of the land stations from which observations are given will be found on Diagram 1 which follows the Charts, as well as the names of various ports in which ships were sometimes anchored, and of other places alluded to in the course of the work. In estimating the force of the American winds the *words* of Beaufort's scale, given in their records, have been converted into *figures* of that scale.

Unfortunately the large bare spaces on the Charts, and the blank lines in the tables of data, show too clearly how defective the work is; however, they contain more simultaneous observations over the sea than any other work of the kind, and produce some very interesting results. Captains will also learn from them how much more complete our future work would be if we had a larger staff of observers, and especially if the observations with verified instruments were much more numerous.†

Paucity of observations, and the fact that several of them are by non-verified instruments.‡ render it impossible to give a correct representation of the distribution of pressure, and it has been thought best not to attempt to rectify the isobars by converting them into smooth curves; in their present state they show all that we have authority for, and prove our need of more observations as well as of a more general use of verified instruments. The reader, having the facts as truthfully represented as the data permit, can if he wishes smooth the curves into the shape which he considers to best represent the truth, which he could not do if *we* smoothed them. The angles in the lines also show which ship's observations have been used.§ Appendix A. shows that a large number of ships do not give either barometer or temperature observations.

* The names of the ships, their owners and captains, and of other contributors, are given in the table at the commencement of Appendix A.

† Observations of currents have not been considered to be sufficiently good or numerous for plotting, but it is hoped that they may be in future work of this kind.

‡ The observations by non-verified instruments have been checked as far as possible by comparing their readings with those of verified instruments in ships near, or with those of land stations when in port.

§ In drawing isobars the direction of the wind has been considered, for instance, suppose two ships in the Nn. hemisphere, the most Nn. one with an E. and the most Sn. one with a W. wind; then, according to Buys Ballot's law, there must be a lower pressure between them than that shown by either ship's barometer, and the positions of intervening isobars must be defective, so, if given at all, they are dotted.

In considering each Chart the remarks will chiefly relate to what was going on over the sea, and on the sea coasts, in the following order. They will first refer to the area of high pressure which exists in the neighbourhood of the Azores, and to the winds, &c. which lie on its Nn. side; then passing south from the Coast of Portugal they will refer to the N.E. Trade, and follow the general course of that wind to the Cape Verds. The S.Wly. monsoon which lies to the Sd. of those islands will next be alluded to. The remarks will then pass on to that part of the sea which lies to the Wd. of the Cape Verds. They will mention what is going on in the neighbourhood of the Virgin Islands in the West Indies, passing on to Bermuda, the Bahamas, Cuba, Florida, the East Coast of North America, Newfoundland and the neighbouring seas, and the wind remarks will conclude with a few words on the inland winds of North America.

In quoting from ships' logs, local time has been converted into Greenwich time in all cases, unless there is a special remark to show the contrary. All remarks in logs which were considered worthy of extraction, and which happened between 0.43 p.m. Greenwich time of a given day and 0.43 p.m. Greenwich time of the following day, have been extracted in the remarks of the first of the two days.

When the direction from which upper clouds move was recorded it has been represented on the Chart by a red arrow without feathers, no speed being given, and has been remarked upon in connexion with the direction of the wind at the earth's surface. The observations at Mount Mitchell, North Carolina, (6,691 feet); Mount Washington, New Hampshire, (6,235 feet); Dovre, Norway, (2,087 feet); Chaumont, (3,780 feet), St. Gotthard (6,870 feet), and Julier (7,305 feet), in Switzerland, have been considered as those of upper currents of air, and represented by red arrows, which have feathers to show the force of the wind. Observations have also been taken at the base of Mount Mitchell; these are shown by black arrows, and the direction from which upper clouds come at that station has been alluded to in the Remarks. Pike's Peak, Colorado (14,216 feet above the sea), was not an observing station in August 1873, but the observations in 1874 have been alluded to in Appendix B.

Lastly the Isotherms, which are represented by red lines, will be noticed, commencing with that in the South, and working Northward; they are generally only drawn for each ten degrees Faht., but in some cases an isotherm of 85° is shown by a thinner red curve. A few observations in red italics are given to show the neighbourhood of the highest temperature recorded, and also the lowest near the Equator and in the Gulf of Guinea. A general statement on the subject of the Isotherms will be found in the Remarks for August 1st.

Before concluding these remarks I wish to express my warm thanks to Mr. C. Harding and the other members of the staff in the Marine Branch for their very willing and able assistance towards bringing out this work.

HENRY TOYNBEE,
Marine Superintendent.

June 1877.

AUGUST 1, 1873.

The Chart shows that this day had the HIGHEST PRESSURE (30·50) to the N.Wd. of the Azores.

The isobars and their distances from each other show approximately the shape of the area of highest pressure, and its gradient, or amount of steepness; especially on its Nn., En.. and S.En. sides.* The isobars also branch in a remarkable way in the neighbourhood of the English Channel, part going to the N.Ed. over Norway, and part to the S.Wd. along the coast of Portugal.

The wind followed the isobars, being S.Wly. over the Baltic and Norway, whilst it was N.Ely off Portugal.

Paucity of observations renders it difficult to represent all the irregularities in the disposition of pressure on the north side of the area of highest pressure, but the isobars and winds to the Ed. of Greenland indicate that a depression lay between that country and Iceland, which depression had a W.S.W. gale at its Sn. verge.

The S.S.Wly. wind in Iceland, and N.Wly. wind in the Faroe Islands, indicate that there was a ridge of high pressure between them, whilst no doubt there was a hollow of lower pressure between the N.W. wind of the Faroe Isles and the S.W. wind in Norway. These ridges and hollows, having only N.Wly., Wly., and S.Wly. winds, very commonly travel to the Ed. or N.Ed., on the Nn. side of the area of highest pressure, as will be seen by the following Charts, and by those published by the Danish Meteorological Institute.† Sometimes a complete system of Cyclonic wind, having a circular area of low pressure, is formed in the Sn. part of the hollow of a wave, but it frequently happens that the N.Wly. and S.Wly. winds extend over several degrees of latitude on each side of such a Cyclonic system.

It will be seen that the wind draws round and slightly *out from* the area of highest pressure in the centre of the Atlantic, whilst it draws round (in an opposite direction) and slightly *into* an area of low pressure.

The researches of Mohn, Hildebrandsson, Buchan, Clement Ley and others, seem to prove that in all cases which they have investigated by means of wind direction and the motion of cirri, the air flows spirally into an area of low pressure at the surface of the earth, and to some extent out from it in the upper regions of the air; whilst the order is reversed with areas of high pressure, the lower air flowing *out from*, and the upper air *in towards*, their centres. It remains to be proved whether the same law holds good with regard to the area of high pressure in the centre of the Atlantic. It is hoped that this work, though very defective in the number and quality of the observations of the direction from which upper clouds come, will throw some light on the subject.

* The method of drawing the isobars so as to apportion the difference between the readings of the barometers at two stations equally over the intervening space frequently represents a gradient to be more uniform than it is, judging by the varying forces of the wind. At present there does not seem to be any safe way of meeting this difficulty.

† Cartes synoptiques journalières; construites par N. Hoffmeyer, Directeur de l'Institut Météorologique Danois.

It must, however, be remembered that there are upper currents of air which (owing to the absence of moisture) do not carry clouds along with them, and that they need some other means than that of cloud-motion to detect them.*

Seamen will recognise in the large flat or shoal of high and equal pressure near the Azores the so-called calms of Cancer, or Horse Latitudes.

To return to the Chart of August 1st, the N.E. TRADE had the force of a strong breeze near Portugal, it became Ely. and squally near the Azores, and was drawn into a N.Wly. wind near the Canaries and Africa; it was, however, N.Ely. again near the Cape Verds, and extended to 13° N.; whilst further to the Ed. a S.Wly. monsoon was blowing in 11° N. The isobar of 29·9 runs parallel to the West Coast of Africa; towards it the N.E. and S.E. Trades turned, and were converted into N.Wly. and S.Wly. winds: these winds met and formed squally unsettled weather between 5° and 10° N.†

The reader will find it useful to consult Plate III. of the "Charts of Meteorological Data for Nine Ten-degree Squares of the Atlantic," lately published by the Meteorological Office. It shows the mean isobars in the neighbourhood of the Doldrums for the month of August, derived from a large number of observations spread over several years.

Between the CAPE VERDS AND THE WEST INDIES observations were very scarce, but the wind seems to have followed the trend of the isobars, becoming Ely. and curving round the area of high pressure. No. 171 (in about 13° N. and 54° W.) had squally weather with lightning.

Passing on to BERMUDA the wind was S.E. and southerly, drawing round the Wn. end of the area of high pressure, but the gradients were very slight and the wind was light.

Near the BAHAMAS, CUBA, AND FLORIDA the prevailing wind was N.Ely. with fine weather.

On the AMERICAN COAST from 30° N. to about 43° N. the pressure gradually decreased and the wind changed from N.W. to W. and S. So that between the Ely. wind in Florida and the Wly. wind further N. there was evidently an area of higher pressure than those which existed to the Sd. and Nd. of it; this will be found to be commonly the case during August.

Near NEWFOUNDLAND the disposition of pressure seems to have been almost uniform, causing light variable airs over that island and the neighbouring sea.

The INLAND WINDS of AMERICA were chiefly governed by an area of low pressure in the Lake Districts. The Chart shows that S.Wly. winds extended in a N.Ely. and S.Wly. direction over nearly 15° of latitude between 75° and 95° W.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were moving from S.byE. above the S.Wly. wind which was blowing to the Nd. of the area of highest pressure, this was at 5.45 a.m. when the wind was S.byW.; cir. from the Wd. over the Ely. wind to the Sd. of that area; cir. from S.W. over the N.E. Trade in

* No method has been devised for this purpose at present, there are however instances on record of the ashes from volcanoes falling on a ship's deck, where a Trade was blowing, several hundred miles to windward of the volcano, indicating a strong upper and counter current of air.

† The reader must remember that by aid of the date and any ship's number taken from the Chart, the instrumental observations, weather, and state of sea experienced by that ship, when recorded, can be found in Appendix A.

about 31° N. and 19° W.; nim. from N.E. over a light Wly. wind in about 8° N. and 26° W.; cir.-c. and cir. from N.E., and high clouds from S.W. over a strong Sly. breeze near the Equator; and cir. from E. over an Ely. wind near the West Indies.

In EUROPE, at Dovre, a mountain station in Norway 2,087 feet above the sea, it was calm, whilst there were S.Wly. winds at lower stations. In Switzerland, at Chaumont, 3,780 feet above the sea, there was a light S.Wly. wind; at St. Gotthard, 6,870 feet above the sea, a light Sly. wind; and at Julier, 7,305 feet above the sea, a very light S.Wly. wind prevailed, with clouds from the Nd.

Over AMERICA the upper clouds were chiefly from N.W., W., or S.W.: at Key West they were with the wind from N.E. On the summit of Mount Mitchell, North Carolina, 6,691 feet above the sea, there was a strong breeze from N.W. On the summit of Mount Washington, New Hampshire, 6,285 feet above the sea, there was a strong gale from S.W., and at Boston the upper clouds were moving from S.W.*

The ISOTHERMS being drawn from observations which were taken as near as possible at the same *actual*, not *local* time, are materially affected by the differences of local times at which those observations were taken; for instance, in Europe the local time was from 1 to 3 *p.m.*, whilst in America it was 7.35 *a.m.* Washington time.

The general effect of this difference in the local times is to lower the isotherms as you pass from their En. to their Wn. ends, the rate of lowering slightly increasing as you progress to the Wd.; so that had all observations for temperature been taken at 1 p.m. *local* time, the isotherms would have been slightly raised as you passed from E. to W., and the greatest change would have been in America.

In spite of this fact the Chart shows that their Wn. ends were already higher than their En., and it will be noticed that the isotherm of 80° was driven much further to the Sd. on its En. than on its Wn. side, whilst there was quite a loop to the Sd. in the En. end of the isotherm of 70°. The lower temperature on the En. side of the Atlantic seems to be caused by the Nly. winds which blow between the area of highest pressure which exists over the centre of the Atlantic and the coasts of Portugal and Africa, whilst the higher temperature on the Wn. side of the Atlantic is no doubt related to the frequency of light Sly. winds which exist on the Wn. side of the area of highest pressure and to the influence of the Gulf Stream.†

Over Europe the isotherms of 70°, 80°, and 90° trended to the N.Ed.

On the Nn. side of the area of highest pressure, and therefore out of the influence of the prevailing Nly. wind, the isotherm of 60° extended from Newfoundland to the British Islands, so that it differed from those of 70° and 80° in having its Wn. end further South than its En., it then trended N.Ely. to Norway. The isotherm of 50° dipped to the Sd. in a remarkable way on the En. side of Greenland, it then kept in

* The observations on Pike's Peak, Colorado, 14,216 feet above the sea, were not commenced in August 1873, but those of 1874 are referred to in Appendix B. of this paper, where they are compared with those of Mount Washington for the same year, and show some interesting facts.

† Sir Wyville Thomson alludes to the difference of temperature between Madeira and Bermuda on p. 345 of his "Voyage of the Challenger," and remarks on its probable cause. These Charts show the difference, and illustrate its cause.

nearly the same parallel across the Atlantic. The isotherm of 40° lay to the Nd. of that of 50°, and also kept in nearly the same parallel.

In America the isotherm of 80° was very irregular, whilst those of 70° and 60° ran nearly parallel, and were within five degrees of latitude from each other.

A temperature of 84° is shown at St. Louis and Goree on the W. coast of Africa and in the neighbourhood of the West Indies; at Cay Sal it amounted to 87°. In the S.W. monsoon which prevails near the Equator and in the Gulf of Guinea temperatures as low as 75° to 79° were experienced.*

AUGUST 2, 1873.

This day still had the HIGHEST PRESSURE (30·50) to the N.Wd. of the Azores. The general trend of the isobars, and shape of the area of high pressure were very similar to those for the 1st. There was still an area of low pressure between Greenland and Iceland, having a heavy Wly. gale on its Sn. side, whilst the ridge of high pressure which was between Iceland and the Faroe Islands on the 1st, had shifted to the Ed. of those islands. The area of low pressure which was to the Wd. of Norway on the 1st, was over the Gulf of Bothnia on the 2nd, and a heavy S.Wly. gale was blowing in Denmark.

N.Wly. winds again appeared at the entrance of the English Channel, which curved sharply into the N.E. TRADE off the Bay of Biscay and coast of Portugal. The Trade was still more Ely. with ships to the N.Ed. of the Azores, whilst further to the Ed. the N.E. wind seems to have been very steady, drawing more Nly. and even N.Wly. near Africa, to the Sd. of the Canaries. Further to the Wd. it extended to 12° N. as a strong N.E. wind.

Between 10° N. and the Equator the S.E. Trade was gradually drawn into the S.W. monsoon. The disposition of pressure here indicates that it was low near Africa, but more observations are needed. The wind having been Ely. in 3° N. and 47° W., whilst it was Sly. in the same latitude and 20° W., seems to indicate that the S.E. Trade branched towards South America and Africa respectively, as it approached those countries.

Between the CAPE VERDS and the WEST INDIES there was little to remark upon, excepting that there was a fresh E.N.Ely. wind with fine weather near the West Indies.

In the neighbourhood of BERMUDA the wind continued light S.Ely. to Sly., and weather fine.

Near the BAHAMAS, CUBA, AND FLORIDA, the wind was chiefly N.Ely., with fine weather. This N.Ely. wind seems to have been related to a small area of high pressure which existed in the Nn. part of the Gulf of Mexico, it will be seen that this higher pressure had Wly. winds on its Nn. side.

* The high temperatures at St. Louis and Goree will be generally alluded to, as these places are situated in the area of low pressure which is almost permanent there at this season. The term W. Coast of Africa will be used when speaking of them.

On the AMERICAN COAST, between 32° and 38° N., there were S.Wly. winds and fine weather. To the Nd. of 40° N. the wind seems to have been governed by a slight area of relatively low pressure near Nova Scotia. The same depression seems to have influenced the wind near the Sn. part of Newfoundland, and in the neighbouring sea, causing overcast and foggy weather.

The INLAND WINDS OF AMERICA were still chiefly related to an area of low pressure near the Lake District, and the long range of S.Wly. winds mentioned on the 1st still continued; there was an area of high pressure in the far West.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from W.N.W. above an Ely. wind to the Wd. of the Azores, and cir.-c. from the N.Wd. above the Sly. wind near the Equator.

In EUROPE, Dovre had a light N.Wly. wind, whilst there was a strong W.N.W. breeze at the lower station of Christiansund. At Brussels there were clouds from N.W. when the wind was light from W. At Chaumont there was a light N.Wly. wind, at St. Gotthard it was fresh from North, and at Julier there was a light S.Wly. air with clouds from the N.

Over AMERICA the upper clouds were chiefly from N.W. or West; in Florida they were with the wind from N.E., though at Key West, further to the Sd., they were from N.W. with a N.E. wind. At the summit of Mount Mitchell the wind was fresh from N.W. whilst on Mount Washington it was fresh from N.

The ISOTHERM of 80° still dipped very much to the Sd. on the En. side of the Atlantic, and that of 70° had still a loop to the Sd. on the En. side of the Azores, whence it ran to the Nd. parallel to the coast. Over Europe the isotherms of 80° and 90 were again shown. The isotherm of 60° still extended from Newfoundland to the Nn. part of the British Islands and thence to Norway. Those of 50° and 40° were similarly placed to those of the 1st. The isotherms of 60° and 70° still approached very near to each other on the Wn. side of the Atlantic, but diverged greatly on its En. side, no doubt because that of 70° was still affected by the Nly. wind. The disposition of temperature over America was very similar to that of the 1st.

A temperature of 84° is again shown on the W. Coast of Africa and on the Wn. side of the Atlantic, whilst one of 79° was experienced in the Gulf of Guinea.

AUGUST 3, 1873.

This day still had the HIGHEST PRESSURE (30·50) to the N.Wd. of the Azores. There was also an area of high pressure in Wn. Europe, and another to the Wd. of the North American lakes. The general trend of the isobars and the shape of the area of highest pressure were still very similar to those of previous days.

There were still indications of an area of low pressure between Greenland and Iceland, though the Wly. gale to the Sd. of it had subsided. The direction of the wind indicates that there was still an area of relatively high pressure between the Faroe Islands and Norway. Over the Gulf of Bothnia there was an area of low pressure. In

Norway there was a moderate W.N.W. gale, whilst in Sweden and the Baltic there was a fresh S.Wly. gale.

It will be noticed that most of the winds on the Nn. side of the area of highest pressure were between S.W. and N.W., and as the wind is found nearly to follow the isobars when the number of observations is sufficient to show them correctly, it follows that the differences of pressure would have been represented by ridges and hollows, if barometrical observations had been more abundant.

N.Wly. winds still existed at the entrance of the English Channel and in the Bay of Biscay, curving sharply round the area of highest pressure, and becoming the N.E. TRADE off the coast of Portugal. Nos. 139 and 177, in 41° N., 15° W. and 43° N., 38° W. respectively, were on opposite sides of the area of highest pressure, and had winds in opposite directions. No. 231, in 38° N. and 20° W., seems to have had a more Ely. wind than ships further to the Ed., as though there were a branching of the air in this position, part drawing Ely. round the area of highest pressure, and part passing along Africa as the N.E. Trade.

The N.E. Trade was strong to fresh down to 14° N. and 41° W. It was slightly more Nly. near Africa than further to the westward; whilst it was drawn into a N.Wly. wind to the Ed. of the Cape Verds.

A fresh S.E. Trade was blowing in 3° N., and there was a squally S.Wly. wind near Africa in 8° N. The doldrum between the N.E. Trade and S.W. monsoon seems to have been in about 10° N., and to have trended in an E.N.E. and W.S.W. direction.

Near the WEST INDIES there was a strong to moderate N.Ely. wind and generally fine weather.

In the neighbourhood of BERMUDA the wind was S.Ely. to S.Wly. round the S.Wn. edge of the area of high pressure. At the island the weather was squally.

Near the BAHAMAS, CUBA, AND FLORIDA the wind was S.Ely. to Ely., and the prevailing weather overcast. In Florida and on the North Coast of the Gulf of Mexico the barometer had fallen since the 2nd, but the Ely. wind in Florida and the Wly. wind north of 30° N. indicate that the pressure was higher in the northern part of the Gulf than it was to the Nd. or Sd. of that position. A similar disposition of pressure existed on the 2nd.

On the AMERICAN COAST between 32° and 45° N. the wind was S.Wly. to Sly., and similar winds prevailed near Newfoundland and over the neighbouring seas.

The INLAND WINDS OF AMERICA were chiefly governed by an area of high pressure in about 43° N. and 93° W., and an area of low pressure in the River St. Lawrence. On the 2nd these high and low pressures were further to the Wd.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were still moving from the Wd. in the neighbourhood of the highest pressure, and cir.-c. from the N.Ed. between the N.E. Trade and S.W. monsoon. At 5 a.m., in about 56° N. and 10° W., No. 192 had cir.-c. from S.S.W., wind S.S.W.

In EUROPE, Dovre had a calm whilst there were Nly. and N.Wly. winds at the lower-level stations near. At Chaumont the wind was light N.Ely., at St. Gotthard light Sly., and at Julier still very light S.Wly. with clouds from the Nd.

Over AMERICA the upper clouds were still chiefly from N.W. and West, though at Norfolk they were with the wind from S.W., while in Florida and at Key West they were with the wind from East.

At Mount Mitchell the wind was still N.W., whilst at Mount Washington there was a moderate gale from West.

The ISOTHERMS of the 3rd are so similar to those of previous days that the remarks for the 1st and 2nd apply to them.

A temperature of 84° is still shown on the W. Coast of Africa, and 85° to the S.Wd. of Bermuda. Temperatures below 80° were still experienced in the S.W. monsoon near the Equator.

AUGUST 4, 1873.

This day still had the HIGHEST PRESSURE (30·50) to the N.Wd. of the Azores. The general trend of the isobars remained much the same, there was still an area of high pressure in Western Europe, and another in North America, the latter was over the Lake District, having apparently moved to the Ed. since the 3rd.

On the Nn. side of the area of highest pressure there were various areas of low pressure, one off the S.E. coast of Labrador, another to the Ed. of Iceland, and a third over the Gulf of Bothnia, between them were ridges of high pressure. Off Labrador the wind was N.N.Ely., but in the other cases it varied from S.W. to West and N.W., as would be the case if atmospheric waves were rolling to the N.Ed. along the Nn. slope of the area of highest pressure. The irregularities in the isobars and direction of the wind indicate these waves, but observations are not sufficiently numerous to make it possible to plot them clearly.

NWly. winds still curved sharply round the N.En. side of the area of highest pressure, and turned into a fresh N.E. TRADE which extended to nearly 15° N. There seems to have been an area of light winds and calms in the neighbourhood of the Cape Verds, with the S.W. monsoon to the Sd. of it, extending to 11° N. Near South America, in about 5° N., there was a light Ely. wind, whilst in 25° W. the wind was more Sly., indicating (as on the 2nd) that the S.Wly. monsoon did not extend far to the Wd.

Near the WEST INDIES there was a strong E.N.E. wind, and at Sombrero squally weather, with lightning.

In the neighbourhood of BERMUDA the wind was light S.Ely. to S.Wly., with squally weather at the island, the wind thus following the isobars in a remarkable way.

Near the BAHAMAS, CUBA, AND FLORIDA the wind was S.Ely. to Sly., weather overcast.

On the AMERICAN COAST, between 30° and 35° N., the wind was probably S.Wly.; from 35° N. to Labrador it was N.Wly. to N.Ely. under the joint influence of the area of high pressure in the Lake District and a long area or hollow of low pressure extending from Nova Scotia to Labrador. Round the Sn. end of the area of low pressure the wind was Wly., whilst it was Sly. on its En. side. This area of low pressure seems to have come from the Wd., as there was one over the St. Lawrence on the 3rd; it is well indicated by the direction of the isobars.

The INLAND WINDS OF AMERICA were chiefly governed by the area of high pressure in the Lake District, they drawing round, but slightly *out of* it.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were moving from the S.Wd. over the N.E. Trade near Madeira, and cir.-c. from the N.Ed. over the Sly. wind which was blowing to the S.Wd. of the Cape Verds. South of Spain at 6.15 p.m. No. 206 had small cum. from W.S.W. with an Ely. wind.

In EUROPE, Dovre had a light Sly. wind, with S.Wly. winds at the lower-level stations near. London had upper clouds from the Wd. with a S.Wly. wind. Chaumont had a very light S.Wly. wind, St. Gotthard a light Sly., and Julier very light S.Ely. winds with clouds still from N.

Over AMERICA the upper clouds were chiefly from the N.Wd., Wd., and S.Wd., showing a general tendency towards the area of high pressure in the Lake District. In Key West and Florida they moved with the wind from S.E. and S. On the summit of Mount Mitchell the wind was S.Wly., agreeing with the direction of upper clouds at Memphis further to the Wd.; in the neighbourhood of both stations the lower wind was N.Ely. On Mount Washington there was a heavy N.W. gale, agreeing in direction with the winds over the sea to the S.Ed. of it.

The ISOTHERMS were still very similar to those of previous days, and the same remarks apply to them. In America that of 70° had been driven to the Sd. since the 3rd, by the Nly. wind which was blowing on the En. side of the area of high pressure there.

A temperature of 84° is shown on the W. Coast of Africa and 83° in the neighbourhood of the Cape Verds, whilst 89° was recorded near Bermuda. Temperature below 80° prevailed in the S.W. monsoon, and 75° is shown near the Equator.

AUGUST 5, 1873.

This day still had the HIGHEST PRESSURE (30·45) in the neighbourhood of the Azores. The area of high pressure in America had become higher and advanced to the Ed. The general trend of the isobars is similar to that of the 4th.

On the North side of the area of highest pressure there were still various areas of low pressure, one extending N.E. and S.W., and forming a kind of trough between the high pressure in the centre of the Atlantic and that which extended out from America. On the N.Wn. side of this trough of low pressure there was a long range of Nly. winds, whilst on its S.En. side the winds were Sly. There was also an area of low pressure near Iceland, having a heavy W.N.W. to S.W. gale on its S.Wn. and Sn. sides. The steep gradients for these gales seem to have been partly caused by the advance of the area of high pressure from America. In Norway there was another area of low pressure, which seems to have been over the sea to the Wd. on the 4th.

It will be seen that the area of high pressure over America had a branching of the isobars at its N.En. angle which extended over the sea, similar to what takes place with the more permanent high pressure in the centre of the Atlantic, and the wind changed

from N.W. to. N.E. just as it generally does in this month near the Bay of Biscay, whilst further to the N.Ed. the wind was S.Wly.

There was a strong N.W. wind to the N.Ed. of the Azores, which turned into the N.E. TRADE in 37° N. The Trade blew with the force of a moderate gale near Madeira and at Mogadore, but became light and variable in 20° N. The S.W. monsoon extended to 13° N.

Near the WEST INDIES there was a moderate E.N.E. to Ely. breeze and generally fine weather,

In the neighbourhood of BERMUDA there was a light air which seemed to circulate round a small local area of high pressure.

Near the BAHAMAS, CUBA, AND FLORIDA there was a light to fresh Ely. breeze with fine weather.

On the AMERICAN COAST the wind was Sly. in 30° N., but elsewhere generally Nly., being influenced by the area of high pressure which had its centre in the neighbourhood of the Lakes.

The INLAND WINDS OF AMERICA were chiefly governed by the area of high pressure already alluded to.

CLOUDS AND MOUNTAIN WINDS.—The red arrows over the SEA show that cir.-c. were moving from the S.Wd. over the N.E. Trade near the Canaries, and cir.-s. from the S.Ed. over a N.E. wind at St. Vincent. South of Spain, at 8.15 p.m., No. 206 had cir. from W.S.W., wind West.

In EUROPE, Dovre had a moderate N.E. wind, whilst stations at lower levels had Wly. to S.Wly. winds. London had clouds from N.W., wind light S.Wly. Chaumont had a light Sly. wind, St. Gotthard a light N., and Julier a very light S.Wly. wind with clouds from the Nd., whilst S.Wly. winds prevailed at the lower stations in the vicinity.

Over AMERICA there were more upper clouds from the Ed. than on previous days, and there was a fresh Ely. breeze on the summit of Mount Mitchell. On Mount Washington both the wind and upper clouds were from the Nd. The upper clouds and mountain winds seem to have drawn round the area of high pressure which was in the Lake District.

The ISOTHERMS resemble those of previous days, that of 60° was driven to the Sd. by the Nly. wind which prevailed on the Wn. side of the Atlantic, in a similar way to that in which the isotherms of 70° and 80° were driven to the Sd. by the more permanent Nly. wind which existed on the En. side of that Ocean. The isotherm of 50° dipped 18° to the Sd. on the Wn. side of the Atlantic.

A temperature of 84° is shown on the W. Coast of Africa, and of 87° to the S.Ed. of Bermuda, whilst it was as low as 77° in the S.W. monsoon.

AUGUST 6, 1873.

This day still had the HIGHEST PRESSURE (30·38) in the neighbourhood of the Azores, but there was an area of 30·30 on the East Coast of North America.

The winds to the N.Wd. and Nd. of the area of high pressure in the centre of the Atlantic were still S.Wly., but they were in close proximity to the N.Ely. winds which were related to the area of high pressure which extended to the Ed. from America; between these winds there seems to have been a narrow but, judging from their force, steep hollow of relatively low pressure. Further to the Nd. there was a branching of the isobars as on the 5th, and the wind again followed them, it being N.Wly. and N.Ely. to the Sd., and S.Wly. to the Nd., so that, as already remarked, with this American area of high pressure on the 5th, we have a similar action of the air as in the case of the more permanent area in the centre of the Atlantic, which is related to the N.E. Trades near Portugal.

The isobars on the N.Wn. side of the area of highest pressure seem to be thrown out of shape by the approach of the American area of high pressure. It also seems worthy of notice that the area near the Azores had not so high a pressure as usual, indicating that its supply of air had been interfered with. It seems probable that if a hurricane had approached the Caribbee Islands from the Ed. on this day, it would have continued on a Wly. track, as it is known some hurricanes do, and not have recurved round Bermuda; for the American area of high pressure would have been in the way of its Nly. progress.

Areas of low pressure were shown near Iceland and over Lapland, with corresponding winds, but more observations are needed for a complete picture of the action of the air in these parts.

There was a splitting of the wind to S.W. and N.W. on the N.En. side of the Azores, and the N.E. TRADE was first shown in about 35° N., whence it extended to the Cape Verds; to the Sd. of those islands the doldrum between the N.E. Trade and S.W. monsoon was prevailing.

A fresh S.W. monsoon with clear weather was shown with No. 52 in 11° N., and there was a light S.Wly. wind with rain and a high N.E. swell with No. 288 in 7° N. and 50° W.

Near the WEST INDIES there was a light Ely. wind and fine weather.

Near BERMUDA the wind seems still to have been governed by a small local area of relatively high pressure lying to the S.Wd. of that island, and by the S.Wn. end of the long trough of low pressure which extended to the N.Ed., the wind being drawn Wly. towards that trough, and N.Wly. further to the Sd. The weather at Bermuda was squally with rain.

Near the BAHAMAS, CUBA, AND FLORIDA there was a moderate to fresh Ely. or S.Ely. breeze with generally fine weather.

On the AMERICAN COAST the wind was N.Ely. to N.Wly. between 30° and 40° N., calm between 40° and 45° N., and Nly. near Newfoundland.

The INLAND WINDS OF AMERICA were chiefly governed by the area of high pressure already alluded to and a relatively low pressure to the Wd. of it.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from S.W.byS. above the S.W. wind to the Nd. of the area of highest pressure;

cir.-c. from W.S.W. over a N.Ely. wind south of Spain; cir.-s. from the Sd. over the N.E. Trade to the Nd. of the Cape Verds. At 11.45 p.m. No. 179, in about 13° N. and 26° W., had cir. from N.E. by N. over a N.N.E. wind.

In EUROPE, Dovre had a Sly. gale which was also blowing at Christiansund; Chaumont had a light S.Wly. wind; St. Gotthard a very light Sly. and Julier a very light S.W. wind. Munich had clouds from S.W. over a W. wind.

Over the western part of AMERICA the upper clouds were from W. or S.W., but on the En. side they and the mountain winds seemed to blow round an area of high pressure which existed on the East Coast; Mount Mitchell having a fresh S.E. breeze, and Mount Washington a gentle Nly. one. Although the black circle on the Chart shows that it was calm at the base of Mount Mitchell, they had cum. moving from the Ed.

The ISOTHERMS of 80° and 70° still bagged very much to the Sd. on the En. side of the Atlantic. Those of 70° and 60° were also driven to the Sd. by the Nly. wind on the Wn. side of the Atlantic. That of 50° still dipped to the Sd. near Greenland.

A temperature of 85° is shown on the W. Coast of Africa and in the neighbourhood of the West Indies, whilst 75° was experienced in the Gulf of Guinea.

AUGUST 7, 1873.

This day still had the HIGHEST PRESSURE (30·37) in the neighbourhood of the Azores. There was also a high pressure to the Wd. of Bermuda and another to the Ed. of Newfoundland. These seem to have passed to the Ed. from the Coast of America since the 6th.

The winds to the Nd. of the area of highest pressure in the Atlantic were still governed by the two areas of high pressure which seemed to have a strip of low pressure between them, the low pressure having N.Ely. winds on its Wn. and S.Wly. winds on its En. side. These winds blew over a long range of latitude, the N.Ely. winds extending, apparently, to Bermuda, whilst the S.Wly. wind formed an unbroken line from the Azores to Norway. S.E. of Greenland there was a branching of the isobars and winds similar to that which existed further to the Wd. on previous days, and to the disposition of pressure and wind which is pretty constant near the Bay of Biscay in August.

The sharp angle which the isobar of 30·2 formed at the entrance of the English Channel is well borne out by the direction of the wind, which was S.Wly. on one side of it and N.Ely. on the other. Barometer observations were wanting to complete the isobar of 30·3 but it has been dotted in a similar shape to that of 30·2, the direction of the wind requiring it to be done.

The N.E. TRADE seems to have extended from the Bay of Biscay to 11° N. and 30° W., where it was suddenly drawn into a W.N.W. wind. A little further to the Sd. the S.W. monsoon also seems to have been drawn into a Wly. wind, and the weather was showery. In about 8° N. and 51° W. there was a light N.Ely. air, whilst further to the Ed., but in the same latitude, the wind was fresh from the Wd.

Near the WEST INDIES the wind was light Nly. and the weather fine, though the barometer had fallen decidedly since the 6th.

Near BERMUDA the barometer had fallen a tenth or more; there was a fresh N.Ely. wind and squally weather; the wind was light N.Wly. further to the Sd., and there was a calm to the S.Ed., round which the wind seems to have blown. This calm seems to have been at the S.Wn. end of a trough of low pressure, and it was accompanied by thunder, lightning, and heavy rain.

Near the BAHAMAS the barometer had risen, but in the neighbourhood of CUBA and FLORIDA it had fallen. The wind was gentle to strong from the Ed., and weather unsettled.

On the AMERICAN COAST the wind was N.Ely. to S.Ely. between 30° and 33° N.; from 35° N. to Newfoundland, along the N.Wn. side of a long area of high pressure, it was S.Wly.

The INLAND WINDS OF AMERICA were chiefly S.Wly. between the area of high pressure which lay over the sea, and the lower pressure to the Nd. On this day there was a violent tornado at Dubuque, Iowa, United States, in 42° 31′ N., 90° 41′ W.* By considering the position of Dubuque on the daily Chart it will be seen that it lay between Nly. and Sly. currents of air.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from the Wd. above a light N.Ely. wind in about 75° N. and 10° W.; two observations of cir. from the Wd. above a S.W. wind, immediately to the Nd. of the area of highest pressure; small high cum. slowly from W. over a N.N.E. wind south of Spain; cir.-c. from the N.Wd. above a Wly. wind near Bermuda.

In EUROPE, Dovre had a moderate N.W. breeze when Christiansund had a W. gale. Chaumont had a light S.W. wind; St. Gotthard a light N., and Julier a very light S.Ely. breeze.

Over AMERICA the upper clouds were chiefly from the Wd., whilst there was a fresh breeze from that quarter on Mount Mitchell, and a strong gale at Mount Washington; there was a calm at the base of Mount Mitchell.

The ISOTHERMS are very similar to those of previous days. That of 80° being bagged to the Sd. on the En. side of the Atlantic, whilst that of 70° was forced to the Sd. by the N.Ely. wind on the Wn. side of the Atlantic, it then ran to 47° N. with the S.Wly. wind on the N.Wn. side of the area of highest pressure; and further to the Ed. it was again driven to the Sd. by the N.E. Trade; as it approached the land it was affected by the land temperatures, and ran to the N.Ed.

The isotherm of 60° ran nearly parallel to that of 70° on the Wn. side of the Atlantic, but went more directly to the N.Ed. after passing the area of highest pressure, because

*See Report of the United States Signal Officer (p. 993) which says, "At this station a violent tornado "occurred on the 7th, which although entirely local in its nature developed an unusual force, and caused great "destruction of property. Owing to the carrying away and destruction of the anemometer at this station no "recorded velocity of this wind has been obtained."

it kept in the S.Wly. winds, and was not affected by the N.E. Trade. That of 50° still dipped to the Sd. near Greenland.

A temperature of 85° is shown on the W. Coast of Africa, and to the Wd. of Havana, whilst temperatures below 80° were still experienced in the S.W. monsoon near the Equator.

AUGUST 8, 1873.

This day still had the HIGHEST PRESSURE (30·43) in the neighbourhood of the Azores; there was also an area of relatively high pressure to the Nd. of Bermuda, which was indicated by Wly. winds in 41° N. and Ely. winds at Bermuda. The area of high pressure which lay to the Ed. of Newfoundland on the 7th, seems to have moved further to the Ed. and to have been in about 30° to 35° W. on the 8th, its place had been taken by an area of low pressure round which there were cyclonic winds.

The undulatory shape of the differences of pressure on the Nn. side of the area of highest pressure is well shown by this day's isobars; the wind having been S.Ely. on the Wn. side of a ridge of high pressure, Wly. on its summit, and N.Wly. on its En. side. There was a hollow of low pressure over the British Islands where the wind was Wly.; further to the N.Ed., where the isobars rose up the Wn. side of another ridge, the wind was S.Wly. These facts are quite in accordance with the theory that waves and hollows of high and low pressures sometimes roll to the N.Ed. along the N.Wn. slope of the area of permanent high pressure in the centre of the Atlantic.

Off the Coast of Portugal the wind was light Wly. to N.Wly. and the N.E. TRADE showed first in the neighbourhood of Gibraltar; it blew fresh in the neighbourhood of the Canaries and Cape Verds. S.W. of the latter islands there was a cyclonic circulation of the wind, with an overcast sky.

Near the WEST INDIES the barometer had again fallen slightly, and the wind was light S.Ely. with fine weather.

Near BERMUDA the barometer had decidedly risen, and the wind was strong from E.N.E. The direction of the wind indicates that there was still an area of low pressure to the S.Ed. of Bermuda, round which the wind circulated.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen, and the wind continued light to fresh from the Ed.

On the AMERICAN COAST the wind was S.Ely. to N.Ely. between 30° and 35° N., Sly. between 35° and 40° N., and Wly. to S.Wly. further to the Nd., where it was under the influence of an area of low pressure which lay near Halifax. The Sly. wind in Newfoundland was very near the N.Wly. wind which existed over the sea to the Ed. of it, which, by Buys Ballot's law, indicates that there was a narrow ridge of high pressure between them.

The INLAND WINDS OF AMERICA were generally light and from various quarters, the distribution of pressure being very equal.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that low cir. were coming from W.S.W. above a light S.W. wind in about 60° N. and 40° W.; cir.-c. from E.S.E. over the N.E. Trade near the Cape Verds. Besides the above, at 9.30 p.m. No. 177 in about 46° N. and 22° W. had cir.-s. from N.W.byN. above a N.E.byN. wind; at 5.45 p.m. Nos. 204 and 213 in about 14° N. and 27° W., had str. and scud respectively from S. over an E.S.E. wind.

In EUROPE, Dovre had a calm with Wly. winds at the lower stations near; Chaumont had a light S.Wly. wind; St. Gotthard a light Sly., and Julier a very light S.Ely. wind, with clouds from the Nd.

Over AMERICA the upper clouds were chiefly from some Wly. quarter. The summit of Mount Mitchell had a fresh N.Wly. breeze, whilst it was calm at the base; at Mount Washington there was a Wly. gale.

The ISOTHERMS are very similar to those of the 7th, that of 60° is inclined to follow the direction of the isobars in about 38° W., as it goes to the Nd. with the Sly. wind, but dips to the Sd. with the N.Wly. wind.

A temperature of 82° is shown on the W. Coast of Africa, and of 85° in the neighbourhood of the W. Indies. In the Gulf of Guinea the mean of four ships' observations was as low as 76°.

AUGUST 9. 1873.

This day still had the HIGHEST PRESSURE (now up again to 30·54) in the neighbourhood of the Azores. It seems worthy of remark that with this return of 30·50 in the centre of the Atlantic other areas of high pressure were not so common, as if the height of one affected that of another.

The winds to the Nd. of the area of highest pressure seem to have been still related to waves of pressure. The crest of a wave which on the 8th was in 30° to 35° W. seems to have been in about 20° W. on the 9th, though its position was poorly shown for want of more observations, so that in 30° W., where on the 8th there were the N.Wly. winds of the En. side of the wave, there were the S.Wly. winds of its Wn. side on the 9th. In 20° W., on the crest of the wave, there were light Wly. winds and fine weather, whilst further to the Ed. were the N.Wly. winds of its En. side. In Belgium were the Wly. winds of the hollow, whilst further to the N.Ed. were the S.Wly. winds of the Wn. side of another ridge.

The N.Wly. wind at the entrance of the Channel seems to have been partly related to the ridge of higher pressure which lay to the Wd. of Ireland, and partly to the more permanent N.Wly. winds which exist on the N.En. side of the area of highest pressure; it will be seen that from these N.Wly. winds branched the Wly. winds of Belgium, and the Nly. winds of the Bay of Biscay.

The N.E. TRADE was first shown in 32° N., where it blew fresh to strong, and extended to a position S.W. from the Cape Verds; the N.Ely. and S.Wly. winds were in close

proximity in about 13° N., causing a slight atmospherical whirl in about 12° N. and 30° W. Near Africa there was a fresh but squally S.Wly. breeze in 14° N.

Near the WEST INDIES the barometer had risen decidedly, and the wind was E.N.E. to S.E., with fine weather.

In the neighbourhood of BERMUDA the barometer had also risen decidedly, and the usual S.Ely. wind had returned, so that the winds of the Atlantic seem to have been more universally governed by the area of highest pressure, now that it had returned to 30·50, and there was an absence of other areas of high pressure over the sea further to the Wd.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was steady, with a fresh N.Ely. to S.Ely wind and cloudy weather. These winds seem to have been related to a slight area of high pressure in the Southern States of America.

On the AMERICAN COAST the wind was S.Wly. from 32° to 37° N., being apparently governed by the area of highest pressure; from 39° to 45° N. it was N.Ely. to N.Wly., being apparently governed by some local depression. In the neighbourhood of Newfoundland, and over the sea from about 40° N. and 65° W. to about 57° N. and 30° W. there seems to have been a long continuous range of S.Wly. wind, drawing more Sly. as the Wn. side of the ridge of high pressure was approached, which ridge has been already alluded to.

The INLAND WINDS OF AMERICA were variable though chiefly Nly. or Sly.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were coming from N.W. above a light Wly. wind to the Nd. of the Azores; cir. from the N.Ed. above a N.Ely. wind in 25° N. and 38° W.; cir.-c. from E.byS. above a moderate Ely. breeze to the Sd. of the Cape Verds. Besides the above, at 9.15 p.m. No 177, in about 46° N. and 20° W., had low cir.-c. from W.byN. above a S.byW. wind.

In EUROPE, Dovre had a calm when a light N.Wly. wind was blowing at Christiansund; Brussels had clouds from S.W. over a Wly. wind; Chaumont had a light Wly. wind; St. Gotthard a fresh Sly. breeze, and Julier a very light S.Wly. breeze with clouds from N. Munich had clouds from S.W. over a fresh Wly. gale.

Over the N.Wn. part of AMERICA the upper clouds were from various directions, but further to the Ed. they were chiefly from N.W., whilst Mount Mitchell had a strong breeze, and Mount Washington a fresh gale from the same quarter. In the neighbourhood of Florida and Cuba the upper clouds were from the N.Ed.

The ISOTHERMS resemble those of previous days. A temperature of 82° is shown on the W. Coast of Africa and 85° at Cay Sal. In the Sly. wind to the S.Wd. of the Cape Verds a reading of 78° was recorded.

AUGUST 10, 1873.

This day still had the HIGHEST PRESSURE (30·51) in the neighbourhood of the Azores. There was also an area of high pressure in the Bay of Biscay (30·3), and another in the Lake District of America, where 30·2 inches is shown.

The winds to the N.Wd. and Nd. of the area of high pressure were S.Wly. from Bermuda to 55° N. and 25° W. To the Nd. of 55° N. there were indications of two ridges and two hollows of pressure; for instance, the isobar of 29·8 dipped S.Ed. from Davis Strait, then turned N.Ed. towards Iceland; at the Faroe Isles it dipped to the S.Ed. again, and although it was not shown to turn to the N.Ed. again, those of lower pressures turn in that direction in the neighbourhood of Finland. The ridge which was to the Wd. of Iceland on the 9th, is now to the Ed. of that island. The isobars in Eastern Europe take peculiar shapes, and although their general trend is indicated, no doubt they suffer from paucity of observations, and possibly some observations were defective on this day.

A branching of the wind existed in about 50° N. and 20° W. where it was W., changing to S.W. over the British Islands and Northern Europe, whilst further to the Sd. it changed to N.W., and to N. near the Coast of Portugal.

The N.E. TRADE extended from 40° N. to the Cape Verds. S.W. of those islands it was drawn into a light N.Wly. wind, where it was in close contact with a light S.Wly. monsoon. The weather with the S.Wly. wind was generally showery, and in some cases squally.

Near the WEST INDIES the barometer had risen, the wind was E.N.E., and weather fine.

Near BERMUDA the barometer had risen decidedly, the wind was S.E. to S. and S.W. round the Wn. end of the area of highest pressure, and the weather was generally fine, though there was a thunder squall at Bermuda itself.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was generally steady, though it had risen at the Bahamas; the wind was S.Ely. to Ely. and N.Ely. with generally fine weather, though it was squally with rain at the Bahamas.

On the AMERICAN COAST the wind was S.Wly. to Sly. from 32° to 36° N.; further to the Nd., where it seems to have been influenced by the area of high pressure in the Lake District and a slight depression in the neighbourhood of Newfoundland and Labrador, it was Nly. to N.Wly.

The INLAND WINDS OF AMERICA, were very light and rather variable, though there was a good deal of S.Ely. wind which seems to have been related to the high pressure in the N.E.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from N.E. over a N.E. wind in about 26° N. and 39° W.; and cir.-c. from W. over a S.W. wind in about 11° N. and 27° 30′ W.

In EUROPE, Dovre had a moderate Ely. wind whilst there were fresh Nly. winds at the lower stations near; Chaumont had a very light Wly. wind; St. Gotthard a heavy Nly. gale; and Julier, as usual, a very light S.Wly. wind, with clouds from the Nd.

Over AMERICA the upper clouds were chiefly from W. or N.W., except in 30° N. and at Key West, where they were N.E. or E. At Mount Mitchell there was a N.Wly. wind, and at Mount Washington a heavy gale from the same quarter.

The ISOTHERMS were very similar to those of previous days. A temperature of 84° is shown on the W. Coast of Africa, and of 85° at Cay Sal, whilst a reading as low as 76° was recorded at Cape Coast Castle in the Gulf of Guinea.

AUGUST 11, 1873.

This day still had the HIGHEST PRESSURE (30·46) in the neighbourhood of the Azores. The area of high pressure which was in the Lake District of America on the 10th had moved eastward towards Quebec.

The winds to the N.Wd. and Nd. of the area of highest pressure were chiefly N.Wly., Wly., and S.Wly., following the ridges and hollows of pressure which were more or less distinctly shown between Quebec and Norway. The ridge which existed in about 10° W. on the Chart of the 10th, lay to the Wd. of Norway on the 11th. There was a long range of S.Wly. to Wly. wind extending from 45° N. and 40° W. to Denmark.

There was a paucity of observations between 40° and 45° N., and the N.E. TRADE was first shown in the neighbourhood of Lisbon; it continued as a fresh breeze to a position S.W. of the Cape Verds, where it became Nly. and eventually N.Wly., there having been but a narrow strip of sea between it and the S.W. monsoon in 8° N. This day seems to have had all the elements for a cyclonic wind in about 10° N. and 27° W. It is supposed that the great cyclone originated in this neighbourhood about this time.

Near the WEST INDIES the barometer was much the same as on the 10th, and the wind was N.Ely. to Ely. with fine weather.

Near BERMUDA the barometer was steady, and the wind was still Ely. to S.Ely., Sly., and S.Wly., blowing round the S.Wn. end of the area of highest pressure, with fine weather.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen generally, the wind was light E. to S.E., and the weather generally cloudy, with squalls at Cay Sal.

On the AMERICAN COAST there was a calm between the S.Ely. wind of Florida and a N.Ely. wind which extended from 36° N. to 42° N. This N.Ely. wind seems to have been related to the area of high pressure near Quebec.

The INLAND WINDS OF AMERICA were from various quarters and much calm prevailed, the disposition of pressure being irregular.

CLOUDS AND MOUNTAIN WINDS.—There are no red arrows OVER THE SEA on the Chart of the 11th. At 10 p.m. No. 202, in about 11° N. and 29° W., had cir. from N.W.byW. with the wind W.byS.

In EUROPE, Dovre had a moderate N.Wly. breeze when there was a Wly. gale at Christiansund; Chaumont and Julier had very light S.Wly. winds, the latter still having clouds from the Nd., whilst St. Gotthard had a fresh Nly. breeze.

Over the northern part of AMERICA upper clouds were chiefly from the Wd., whilst over its Southern part they were chiefly from the Ed. On Mount Mitchell there was a light N.Ely. wind, whilst at its base it was calm. On Mount Washington there was a fresh N.W. breeze.

The trend of the ISOTHERMS is very similar to that of previous days. A temperature of 83° is shown at St. Louis, and of 85° in the neighbourhood of Cuba, whilst a reading as low as 76° was recorded to the Sd. of the Cape Verds.

AUGUST 12, 1873.

This day still had the HIGHEST PRESSURE (30·45) in the neighbourhood of the Azores, and pressure was still high at Quebec and near Portland Maine.

The winds to the Nd. of the area of highest pressure were chiefly governed by an area of low pressure near Iceland, and a ridge of higher pressure extending to the N.Wd. from Norway, and inclining with a moderately steep gradient in the same direction.

The isobar of 30·3 extended to Rochefort in the Bay of Biscay, where a Nly. wind seems to have been blowing at the En. end of a narrow ridge of high pressure which had S.Wly. winds along its Nn. side, whilst there were N.Ely. winds to the Sd. and in the Mediterranean. The N.E. TRADE extended from 37° N. to 11° N., where No. 87 had a gentle *Nly.* wind with gloomy weather. This ship was bound to the Nd., she had a light but very unsteady and squally Nly. wind for the next 24 hours, which drove her to the W.N.W.; that wind was followed by a S.Wly. wind, which shows that the S.Wly. wind was pressing to the Nd. in opposition to the Nly. wind. No. 209, about 6° to the Ed. of No. 87, had a south gale with squalls and rain; No. 203 (to the Wd. of No. 209) had a S.byW. wind; unfortunately the force is very doubtful, it was probably much greater than that shown on the Chart. She had an overcast sky, very heavy rain, and a high S.S.W. sea. Both Nos. 203 and 209 were steering to the S.Ed. on the Starboard tack, and their barometers rose nearly a tenth in the next twelve hours. No. 110, to the Nd. of No. 87, had a squally N.E. Trade. These ships seem to have been experiencing a cyclonic wind which was drawing towards an area of low pressure which lay in about 30° W. The Chart of the 11th shows a similar cyclonic movement, but the Sly. wind did not seem to extend so far N. as on the 12th. This is supposed to have been the commencement of the great Cyclone, and if so it evidently originated at a time when the S.W. monsoon was forcing its way to the Nd. against the N.E. Trade.

Near the WEST INDIES the barometer had risen slightly, and the wind was N.Ely. with fine weather.

Near BERMUDA the barometer was steady, the wind light S.Ely. to moderate S.Wly., with squally weather, thunder, lightning, and heavy rain at the island, also a waterspout in the N.E.*

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was pretty steady, the wind light Ely.. and the weather generally fine, but cloudy and squally at Cay Sal.

On the AMERICAN COAST the wind was Sly. to S.Wly. between 30° and 35° N., calm in 36° N., and Ely. to N.Ely. further to the Nd. where it was influenced by the area of high pressure near Portland. Over the sea to the Sd. of Newfoundland there were light variable winds existing between the Nly. and Ely. winds blowing round the high pressure near Portland, and the usual S.Wly. winds along the N.Wn. side of the area of highest pressure.

The INLAND WINDS OF AMERICA were variable.

* The chart shows that the wind changed from N.W. to S.S.W., but the time of change is not given.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were moving from the S.Wd. over a Wly. gale to the Sd. of Greenland; cir.-s. from the Sd. over a S.W. wind near the English Channel; cir.-c. from N.N.E. over a S.S.W. wind, and cir. from N.W. over a S.W. wind to the Sd. of the Cape Verds, also cir.-s. from the Nd. over an E. wind to the Sd. of Cuba.

In EUROPE, Dovre had a light S. wind, with a light Nly. wind at Christiansund, but strong Sly. winds at other stations; Brussels had clouds from the N.Wd. over a Wly. wind; Chaumont had a light N.Wly. wind; St. Gotthard a light Nly. wind with clouds from the N.Wd.; Julier a light S.E. wind with clouds from the Ed.

Over AMERICA the upper clouds were chiefly from N., W., or S.W.; in New Brunswick they were from N.E. above a fresh N.W. breeze. The fact that upper clouds moved from S.W. (or towards the highest pressure) at New York and Cleveland, when the wind was E. and S.E., seems to support the idea that there is sometimes an indraft in the upper regions of the atmosphere towards an area of high pressure; but this indraft is not always shown on these Charts, perhaps from the fact that it may be only the very highest clouds which flow towards the high pressure. It would be well to remark on the apparent height of upper clouds when recording their motion. The summit of Mount Mitchell had a light S.W. wind and cum. from the Wd., whilst at the base it was calm. Mount Washington had a light N.W. wind.

The ISOTHERMS are similar to those of previous days, excepting that of 70°, which keeps to the Nd. in the S.Wly. winds, and does not dip to the Sd. on the En. side of the Azores, but it is manifest that if that of 75° were drawn, it would dip S. with the Nly. winds in a similar way to that of 80°.

A temperature of 82° is shown at Goree whilst it was only 73° at St. Louis, this remarkably low temperature was accompanied by a Nly. wind and continued throughout the day. A reading of 85° is shown near the W. Indies, whilst 78° was experienced to the Sd. of the Cape Verds.

AUGUST 13, 1873.

This day still had the HIGHEST PRESSURE (30·42) in the neighbourhood of the Azores. It amounted to 30·38 with No. 101 about 300 miles to the S.Ed. of Newfoundland, and to 30·33 at Quebec.

The winds to the Nd. of the area of highest pressure were still chiefly governed by an area of low pressure near Iceland, and ridges of higher pressure on each side of it. The ridge of high pressure spoken of on the 12th had passed to the Ed., and its Wn. side was over Norway on the 13th, whilst its top seems to have been in about 30° E., where there was a light Wly. wind at St. Petersburg.

The direction of the wind between 55° and 60° W. indicates a slight waving in the pressure there; for instance, it was N.W. near Greenland, and the isobars run to the S.Ed.; it was then W. to S.W. from the south of Greenland to 15° W.; W. again over the British Islands, and S. in Norway. No doubt more barometer observations

would have shown a slight tendency to the N.E. in the isobars where the wind was S.Wly. In Iceland the wind was Ely., indicating a cyclonic movement in the air.

The wind again curved sharply round the isobars from W. in the English Channel, to N.W. at Rochefort, and N.E. at Corunna; the N.E. TRADE seems to have extended from the last-named place to 14° N. and 35° W. On the 11th and 12th we remarked on the cyclonic tendency of the wind to the S.Wd. of the Cape Verds, it was also there on the 13th, and No. 46 (in about 18° N. and 32° W.) had a strong N.E. Trade with heavy puffs and gloomy weather. In the report of the Chief Signal Officer, United States Army, for 1873, p. 1027, is the following remark respecting the hurricane which blew at Nova Scotia and Newfoundland on the 24th and 25th of the month: "The first report that has reached "us concerning this hurricane is probably that of the 13th August, when the barque "'Crest of the Wave' reported a heavy gale veering from N.E. to S.E. in 14° N. and "27° W." This veering of the wind is what would have happened if the Nn. part of a hurricane had passed to the Wd. over the ship. Unfortunately the United States signal officer could not supply us with an extract from the "Crest of the Wave's" log, as his was only a newspaper report, and we have tried in vain to get the log. It is probable that the log of the "Crest of the Wave" was kept by nautical time, so that the remark may allude to the 12th civil time, which agrees well with the data in this Office.

Near the WEST INDIES the barometer had risen slightly, the wind was moderate from E.N.E., and weather generally fine, though No. 171 had squalls and showers.

Near BERMUDA the barometer was steady, and the wind S.Ely. to S.Wly.; No. 86, to the Ed. of Bermuda, had gloomy weather with heavy showers; whilst No. 189, about 6° to the Nd. of that island, had an Ely. gale with rain, and vivid lightning in the W., the sea was turbulent. This ship was steaming to the Sd., and the wind veered to S.E. and S. with decreasing force, so that she seems to have passed south along the En. side of an area of low pressure which was probably related to the low pressure over America.

No. 22, to the Wd. of Bermuda, had a S.Wly. wind with heavy lightning and rain. This wind continued as she steamed to the N.Ed., so that it also was probably related to the area of low pressure lying over the American coast.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was steady, the wind varying from E. to S.E., and the weather fine.

On the COAST OF AMERICA the barometer had fallen, under the influence of an area of low pressure; the wind was S.W. to W. between 30° and 35° N., and E. to N.E. further to the Nd., the wind being apparently governed by the area of low pressure already alluded to, and an area of high pressure to the N.N.E. of it. On the top of Mount Mitchell, between the 12th and 13th, there was the greatest fall of the barometer in 24 hours which occured there in the month. The report of the Chief Signal Officer, United States Army, p. 1026, says: "The depression passing through Delaware on the "nights of the 13th and 14th was apparently accompanied by two, if not three or four, "storm centres, which, being of the nature of tornadoes, seemed to have done con-

" siderable damage, both by wind and rain, in Eastern Pennsylvania and in Maryland."* There seems to have been another area of low pressure, or an extension of this one, over the sea to the Ed. of Virginia, as already stated in the remarks on the weather near Bermuda.

The INLAND WINDS OF AMERICA were chiefly governed by the area of high pressure near Quebec, and that of low pressure to the S.Wd. of it: between them the wind arrows show a range of N.Ely. wind in a N.W. and S.E. line extending over 20° of longitude.

CLOUDS AND MOUNTAIN WINDS.—There are no red arrows OVER THE SEA on the 13th, but at 7.15 a.m. No. 175 in about 46° N. and 17° W. had cum.-s. from the W. with a N.E. wind, whilst at 7.30 p.m. No. 181 in about 35° N. and 54° W. had cir. from W.byS. with a S.W. wind.

In EUROPE Dovre had a moderate Sly. breeze, Chaumont and Julier a light S.Wly., and St. Gotthard a light Sly. wind; Julier, as usual, had clouds from the Nd.

Over AMERICA the upper clouds were chiefly from N., N.W., or W.; the summit of Mount Mitchell had a strong S.W. wind, whilst there was a light Ely. air at its base. Mount Washington had a strong S.Ely. wind which was inclined towards the area of highest pressure.

The ISOTHERMS are very similar to those of the 12th.

A temperature of 84° is shown at St. Louis on the W. Coast of Africa, instead of 73° as on the 12th; to the Sd. of Cuba there was a temperature of 87°, whilst readings were generally below 80° in the S.W. Monsoon near the Equator.

AUGUST 14, 1873.

This day had the HIGHEST PRESSURE (30·35) in the centre of the Atlantic. It was nearly as high south of Newfoundland, and again in the neighbourhood of Quebec.

The winds to the Nd. of the area of highest pressure were still governed by a large area of low pressure in the neighbourhood of Iceland, which had a ridge of higher pressure on each side of it, and apparently a higher pressure to the Nd. of that island, as the wind was still Ely. there. The ridge of relatively high pressure over Norway had a hollow of low pressure to the Ed. of it over Sweden; the wind followed the undulations above alluded to, being S.Wly., Wly., N.Wly., Wly., and S.Ely. between the British Islands and Lapland.

In the Bay of Biscay the wind veered from S.W. to N.W., and eventually to N.E. off Cape Finisterre.

The N.E. TRADE was very Nly. from the Canaries to the Sd., and the isobars in that neighbourhood had changed their direction, having become concave towards the Coast of Africa. No. 110 (homeward bound) in about 15° N. and 38° W. had a very heavy gale from the N.Wd.; she had experienced a fresh N.Ely. wind since noon of the 11th,

* Letter from Cleveland Abbe, Esq., to the Chief Signal Officer U.S.A.

and at 2 p.m. of the 13th she had a fresh N.Ely. wind and cloudy weather, ship heading W. by N.; at 9 p.m. all small sails were furled; at midnight, 13th, strong N.Ely. breeze with rain, furled topgallant sails; 8 a.m., 14th, furled upper topsails; 10 a.m., furled courses; at 11 a.m. the wind shifted from N.Ely. to N.Wly.; noon, wind blowing furiously with blinding heavy rain; furled fore and mizen topsails, maintopsail blew away; put a topgallant studdingsail in the mizen rigging to keep the ship to the wind. The N.Wly. wind only lasted two hours, after which it was moderate from the Ed. and S.Ed.

At midnight of the 13th, No. 167, to the Ed. of No. 110, had experienced wind veering from S. to N.N.W. with gusts, vivid lightning, peals of thunder, and heavy rain; she was bound to the Sd. About the same time No. 87 (S.W. from No. 167) had a very unsteady S.Wly. wind with frequent squalls of wind and rain, in quick succession. These three logs show that strong N.Ely. and S.Wly. winds were in close contact at midnight of the 13th, and that a very heavy W.N.W. gale blew from 11 a.m. to 1 p.m. of the 14th with No. 110, whilst there was another W.N.W. gale near Africa with No. 155; this ship had very heavy squalls and continuous heavy rain; she was steaming to the Nd. and her N.W. gale lasted till noon 15th. These facts, considered together with the data of the two previous days, seem to show that the great cyclone had formed in this neighbourhood. The wind arrows show a stronger indraught towards Africa than usual, and the barometer was higher than usual in the S.W. monsoon district, indicating an influx of air from the Sd.

The probable position of the hurricane is shown on this day's Chart by a black dot near No. 110.

Near the West Indies the barometer was steady, the wind generally light Ely., and weather fine. No. 171 (in about 20° N. and 61° W.) had a fresh N.Ely. wind and squally weather with a heavy sea.

Near Bermuda the barometer had scarcely changed, there was a strong squally Sly. wind with rain there, and a turbulent sea with No. 189 to the Nd. of that island. South of Bermuda the wind was light S.Ely. and weather fine. There must have been an area of low pressure to the N.Wd. of Bermuda, to which the strong Sly. wind at that island, the "smart" S.Wly. wind of No. 22 to the Wd. of Bermuda (which ship had vivid lightning at 1 a.m., 14th, and probably also at the time of the Chart), and the heavy N.E. gale near New York were related. The strong Sly. breeze at Cape May, in a position S.W. from the N.Ely. gale, shows that the action of the air was remarkable. Probably there were other storm centres, as suggested by Mr. Cleveland Abbe in his letter to the Chief Signal Officer; see a quotation from his letter in the remarks on the 13th.

The N.E. wind at New York, Long Island, and Portland blew directly towards the S. wind at Cape May, and illustrates the error in supposing that the central area of low pressure is always at right angles, or nearly so, to the direction of the wind, for no doubt the area of low pressure to which the Cape May wind was related lay to the S.Wd. instead of to the S.E. of the N.E. wind. The *high* pressure at Quebec probably caused this peculiarity, and proves the necessity for knowing the general disposition of

areas of high pressure around an area of low pressure when estimating the direction of its centre.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen, the wind was chiefly E. to S.E. and S.W., with fine weather. The falling barometer and fresh S.W. wind were probably related to the area of low pressure which lay to the N.Ed., and of which we have already spoken.

On the COAST OF AMERICA the wind was governed by the area of low pressure already alluded to, and by the high pressure in the neighbourhood of Quebec, causing a steep gradient for N.Ely. winds. In the neighbourhood of the high pressure which lay over the sea to the Sd. of Newfoundland, the wind was light and variable with fine weather.

The INLAND WINDS OF AMERICA were also chiefly governed by the areas of high and low pressure just alluded to. There was still a long range of N.Ely. winds extending from the coast to the Lake Districts. Another area of low pressure was showing in the far West. On this day the *base* of Mount Mitchell had its lowest pressure for the month.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were moving from N.W. over a light variable air to the S.Wd. of the Azores; cir. from E.N.E. and cir.-c. from N. over the S.W. monsoon.

In EUROPE, Dovre had a calm, with strong S.Wly. to N.Wly. winds near; Chaumont a light W., St. Gotthard a very light Nly., and Julier a very light S.W. wind, whilst Julier had clouds from the Nd.

Over AMERICA the upper clouds seem to have circulated, with the lower wind, round the area of lowest pressure, but they drew more *away from* than *towards* its centre. The mountain winds also moved round the lowest pressure, and there was a strong wind from N.E. at Mount Washington which agreed in direction with the wind on the coast.

The ISOTHERMS were still very similar to those of previous days, that of 80° being driven very much to the Sd. on the En. side of the Atlantic; whilst that of 70°, after having been driven to the Sd. by the Nly. wind over America, passed to the Nd. of the area of high pressure, escaped the Nly. wind on the En. side of the Atlantic, and continued its course to the N.Ed.

A temperature of 84° is shown on the W. Coast of Africa, and of 85° in Cuba, whilst a reading of 73° was experienced near the Equator. This cold air near the Equator is to some extent caused by the cold current of water which comes from the Sd. and runs to the Wd. along the Equator at this season of the year. See Plate III. of Official No. 27 published by this Office.

AUGUST 15, 1873.

This day had the HIGHEST PRESSURE (30·32) at Frankfort; it was 30·29 in America (at Cheyenne in 105° W.) and the isobar of 30·2 is shown irregularly over the centre of the Atlantic. The highest reading over the sea (30·24) was with No. 36, south of Newfoundland.

The winds to the Nd. of the central area of high pressure in the centre of the Atlantic still followed the undulations of pressure shown there. In about 50° W. there was a S.Wly. wind extending from about 48° N. to Greenland, whilst in 35° W. there was a N.Wly. wind extending from 48° to 55° N. To the Wd. of the British Islands and Norway there was another long range of S.Wly. wind, whilst in Sweden and the Gulf of Bothnia it was N.Wly. and Wly. At the same time there were strong Ely. winds in Greenland and Iceland, indicating that there was a higher pressure to the Nd. of those places.

There were very few observations in the N.E. TRADE region on the En. side of the Atlantic, but the few that were there indicate that the Trade was remarkably light and variable, which might have been expected considering the disturbed state of the central area of high pressure. In about 12° N. there were the usual Wly. winds to the Sd. of the Cape Verds. No. 87 (in about 14° N. and 34° W.) had a light variable air, and a short confused sea *from all points*. No. 110, the ship which had a W.N.W. gale on the 14th, was now in about 15° N. and 38° W.; she had a light Ely. wind at the time of the chart, but it was preceded and followed by Ely. squalls, which compelled her to take in her topgallant sails, so that her weather was probably still affected by the hurricane. The black dot in about 16° N. and 43° W. indicates the supposed position of the centre of the hurricane, perhaps the fact that it lay to the Sd. of the area of high pressure in the centre of the Atlantic interfered with that area, as the isobars and wind arrows show that both pressure and wind were much disturbed at this time. Further work of the kind is needed to prove or disprove this theory. The observations of subsequent days will however show that the hurricane did exist in some parts of the sea without interfering with the winds and weather of ships which were comparatively near it.

Near the WEST INDIES the barometer had fallen very slightly, the wind was N.E. to E.S.E. and the weather fine to cloudy and misty.

Near BERMUDA the barometer had risen, and the strong Sly. wind had subsided into light S.Ely. to S.Wly. winds with fine weather.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen about ·05 in., the wind was fresh S.E. to S.W., and the weather fine to cloudy.

On the COAST OF AMERICA the wind was still governed by an area of low pressure in the neighbourhood of Washington, it having been Wly. and Sly. to the Sd., and N.Ely. to the Nd. of that place. There was a long band of N.Ely. wind which extended from Nova Scotia to New York and inland to the St. Lawrence; the air curved round the Wn., Sn., and S.En. sides of the area of low pressure, forming a kind of scroll, somewhat like its action on the 14th, but the winds were lighter, and this area of low pressure seems to have filled up, and not to have travelled further. On this day Knoxville and the *summit* of Mount Mitchell had their lowest pressures for the month, the base of that mountain having had its lowest on the 14th. There was a circulation of moderate to light breezes round the area of high pressure to the Sd. of Newfoundland, with fine weather.

The INLAND WINDS OF AMERICA were still partly governed by the area of low pressure which lay near its East Coast; further to the Wd. they were Sly. under the influence of another area of low pressure, whilst a Nly. wind was blowing in the far West on the En. side of an area of high pressure.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were coming from the S. over a moderate W.S.W. breeze near the West Coast of Norway; cum. from N.N.E. over a light Ely. air with No. 181 in about 36° N. and 51° W.; and cir.-c. and cir.-s. from W. by S. over a W. by N. wind to the S.Wd. of the Azores. It will be noticed that they were lower clouds (cum.) which came from N.N.E. with No. 181; upper clouds seem generally to move from the Wd. in this neighbourhood.

In EUROPE, Dovre had again a calm with strong S.Wly. winds near; Chaumont had also a calm, whilst St. Gotthard had light S. and Julier very light S.Wly. winds, the latter still having upper clouds from the Nd.

Over AMERICA, in the neighbourhood of the area of low pressure, the upper clouds and mountain winds seem to have followed the course of the lower winds; Knoxville, however, had upper clouds from N.E. moving away from the area of lowest pressure. Further West they were from N. and N.W., while in Florida they were from N.W. over a S.W. wind; generally they have been from the Ed. in the neighbourhood of Florida and the West Indies.

The ISOTHERMS are similar to those of previous days.

A temperature of 84° is still shown on the W. Coast of Africa and of 88° near Cuba, whilst 73° was again experienced near the Equator.

AUGUST 16, 1873.

This day still had the HIGHEST PRESSURE (30·28) in Europe, but it had advanced 10 degrees to the Ed., for it was at Cracow instead of Frankfort. Pressure was, however, 30·24 at the Azores, and again at Bermuda, whilst No. 56, to the S.Ed. of Newfoundland, had 30·23.

The winds to the Nd. of the central area of high pressure in the Atlantic still undulated with the changes of pressure, being N.W. to W., S.W., and S.; there were gales to the Sd. of Greenland, and to the S.Wd. of Ireland. There was a long range of Sly. wind over Wn. Europe, extending from Switzerland to 68° N.; it had a ridge of high pressure to the Ed. of it, which produced a light Nly. wind in Sweden, on its En. side, at the same time that St. Petersburg, in the hollow to the Ed. of the ridge, had a moderate Wly. breeze.

There was a splitting of the wind near the English Channel, part being W. and S.W., whilst further to the Sd. it was N.Wly.

The N.E. TRADE was first shown in 35° N., but it was light and nowhere exceeded the force of 4, except in about 17° N. and 39° W., with No. 110, where it was E. by N. 6, with cloudy weather; it will be remembered that she had Ely. squalls on the 15th, and it is probable that the hurricane was about 500 miles to the Wd. of her on the 16th; it

may have drawn the air towards it, as there are indications of such an action on other days when its position was better known.

Near the WEST INDIES the barometer was steady, with a strong to fresh Ely. wind and cloudy misty weather: at the island of Trinidad, however, the barometer had fallen ·07 in., and it was calm, with fine weather. At St. Thomas the wind blew very hard and puffy during the night of the 16th.

Near BERMUDA the barometer was steady, though it had risen slightly at the island, where there was a slight area of high pressure round which the wind circulated, with fine weather. To the S.Wd. of the island Nos. 267 and 234 had a squally and rainy S.E. wind.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was steady, the wind was still from S.E. to S. blowing round the higher pressure over the sea, and the weather fine to overcast.

On the COAST OF AMERICA and over the sea in its neighbourhood the wind was generally S.Wly., blowing between the higher pressure over the sea and a lower pressure in the Lake District.

The INLAND WINDS OF AMERICA were chiefly governed by the area of low pressure in the Lake District, and a high pressure in the West.

CLOUDS AND MOUNTAIN WINDS.—The red arrows over the sea show that cir. and cir.-c. moved from N.N.W. over a S.Ely. wind in about 38° N. and 50° W.; cir.-c. and cir.-s. from S.E.byE. over a S.byE. wind to the S.Wd. of the Azores (this observation was really at 6.30 p.m., but as the wind nearly agrees with that on the Chart, it is given); and cir.-c. from S.W. over a S.S.W. wind near Bermuda. Besides the above, cir.-c. were noticed without motion over a S. wind in about 7° N. and 16° W., with No. 216.

In EUROPE, Dovre had a Sly. breeze whilst there was a light Nly. breeze at Christiansund; Chaumont had a light, and Julier a very light, S.Wly. wind, whilst St. Gotthard had a fresh Sly. wind. Julier still had clouds from the Nd.

Over AMERICA the upper clouds still had a tendency from N.W., W., and S., following very much the lower winds. Mount Mitchell had a fresh S.W. wind on the summit, with cum. from W. and a calm at its base. The greatest rise of the barometer in 24 hours which occurred on the summit during the month (·090 in.), took place on this day and again on the 29th. Mount Washington was remarkable in having a fresh breeze from the Nd. when the lower winds and upper clouds near were from some Sly. direction. About 4 a.m., 17th, Mount Washington recorded a N.W. wind having a speed of 100 miles an hour, when it was S.W. at Portland and Quebec, with a speed of only 12 miles an hour. On p. 993 of the Report for 1873 of the Chief Signal Officer, United States Army, is the following remark: "The unusual velocity of 100 miles per hour was "reported from Mount Washington, N.H., during the storm of the 16th. The force "developed by this wind has not been equalled at any other station since the establish-"ment of the signal service."

The ISOTHERMS resemble those of previous days, that of 70° dips to the Sd., with the Nly. wind between the Azores and Portugal.

A temperature of 80° is shown at St. Louis on the W. Coast of Africa and one of 86° to the Sd. of Cuba, whilst it was as low as 74° in the Gulf of Guinea.

AUGUST 17, 1873.

This day had the HIGHEST PRESSURE (30·36) at the Azores, but it amounted to 30·31 in the Bay of Biscay.

The winds to the Nd. of the central area of high pressure still undulated between N.W., W., and S.W. following the ridges and hollows of pressure; to the S.Wd. of Ireland there was a heavy S.Wly. gale, and another on the W. Coast of Norway, they were on the Sn. sides of independent hollows of low pressure: another hollow with its corresponding winds lay over Labrador; so that this day's Chart has the ridges and hollows of three waves of pressure partially represented.

There were very light Nly. winds on the large flat of high pressure near the Azores (the "Horse Latitudes"). and the N.E. TRADE first showed itself in about 38° N. To the Ed. of the Cape Verds the wind was mostly light and variable.

Near the WEST INDIES the barometer had fallen ·06 in. since the 16th, the wind at Sombrero had shifted from E. to N.E., and freshened to a strong breeze, whilst the weather continued cloudy and misty; there had been a squall there at 9 a.m. It seems most probable that the centre of the hurricane was about 700 miles to the Ed. of Sombrero at this time, and that this fall of the barometer and backing of the wind, together with the S.Ely. swell which was experienced by No. 189 to the Sd. of Bermuda and is mentioned below, were the first indications of the hurricane's approach to the Wn. side of the Atlantic.

At St. Thomas there was no record of the barometer, but the wind was N.E. 6, and it blew very hard and puffy during the night of the 17th, but calmed off towards morning of the 18th.

Near BERMUDA the barometer was steady, and the wind still circulated round the high pressure there. No. 189, to the Sd. of Bermuda, had a S.Ely. swell which continued throughout the day, and was most probably due to the S.E. wind of the hurricane, which appears to have been about 900 or 1,000 miles to the S.Ed. of that ship: on the 16th she had experienced a "Wly. swell," then a "turbulent sea," which was probably the contact between the Wly. and S.Ely. swells, and at 8 a.m. of the 17th a S.E. swell was recorded. This ship was steaming to the Sd., and passed to the Wd. of the hurricane on the 18th and 19th, getting first an Ely., then a heavy Ely., and eventually a very heavy Ely. swell whilst the wind was moderate, but backed from N.E. to N.W. and W.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen, the wind was S.Ely. to Sly., and the weather generally fine.

On the COAST OF AMERICA the wind was Sly. to S.Wly. up to about 37° N., to the Nd. of this position it was N.Wly., being governed by the area of low pressure which was alluded to on the 16th, and which had moved Ed. to Labrador by the 17th: there was a fresh S.W. gale in the St. Lawrence whilst the wind was N.Wly. on the coast.

The INLAND WINDS OF AMERICA were variable and light to fresh in force.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. moved from the Wd. over a S.W. wind to the Wd. of Scotland; cir. from W. by N. over a N.Wly. wind in about 48° N. and 28° W.; cir. from N.W. over a N.E. wind in about

40° N. and 50° W.; cir.-c. from W. over a Sly. wind to the Wd. of Sicily; cir.-c. and cir.-s. from E.byS. over a S.Ely. wind to the S.Wd. of the Azores; cir. from E.N.E. over a S. wind in about 6° N. and 16° W.; and cir.-c. from E. over a N.E. wind to the Sd. of Bermuda.

In EUROPE, Dovre had a strong Sly. breeze whilst there was a S.S.W. gale at Christiansund; Chaumont a light N.W., St. Gotthard a light N., and Julier a very light S.Wly. breeze, but the clouds at Julier were from S. instead of being from N., their almost constant direction.

Over AMERICA the upper clouds were chiefly from the Wd. or S.Wd.; in the neighbourhood of Cuba and Florida, where they are most frequently from the Ed. or N.Ed., they were also from S.W. and W. Mount Mitchell had a gentle Ely. breeze at its summit and a calm at its base. Mount Washington had a strong gale from S.W. when there were S.Wly. winds in the St. Lawrence, and Nly. to N.Wly. on the coast to the Ed. of it. The upper clouds over New York were also from S.W. The remarks of the 16th show that Mount Washington had experienced a N.W. gale of 100 miles an hour at about 4 a.m. of this day.

The ISOTHERMS are similar to those of previous days.

A temperature of 80° is again shown at St. Louis on the W. Coast of Africa, and one of 87° in the Gulf of Mexico, whilst 77° was experienced in the S.W. monsoon near the Equator.

AUGUST 18, 1873.

This day had the HIGHEST PRESSURE (30·48) to the N.Wd. of the Azores; the direction and force of the wind indicate that the pressure must have been slightly higher where the words "High Pressure" are printed on the Chart. There was another area of high pressure in the neighbourhood of Nova Scotia.

The winds to the Nd. of the central area of high pressure were governed by two well-marked hollows and a ridge of pressure. At 7 p.m., No. 194 was just leaving Fritz Harbour, Greenland, and had a N.W. wind instead of the variable air recorded on the Chart, her barometer was rising fast. There was a branching of the wind to the Sd. of Newfoundland and to the N.Ed. of the area of high pressure near Nova Scotia, similar to the more permanent branching which is shown at the same time near the Bay of Biscay and Portugal.

The long range of N.Wly. to Wly. winds which were blowing to the Wd. and Sd. of Ireland, and sometimes amounted to a gale, was due to the ridge of high pressure extending from 50° N. to Iceland, and to the central area of high pressure in the Atlantic considered together with the hollow of low pressure over the British Islands; in the Sn. part of the hollow there was almost a cyclonic movement of the wind, but the Ely. wind at Glasgow and the Faroe Islands was very light. It will be seen that the ridge was over the British Islands on the 19th. This day's Chart illustrates

well the changes of wind from S. to S.W., W., and N.W., to which our latitudes are liable. It also shows how there may be strong Wly. and N.Wly. winds in the Sn. and Wn. parts of a depression, when the S.Wly. and Sly. winds are light. In winter, when high pressure is more common over the land than over the sea, and the central area of high pressure in the Atlantic is probably much further south, the Sly. and S.Wly. winds may be the strongest.

The N.E. TRADE commenced in about 40° N.; there were no observations on the En. side of the Atlantic between that latitude and 20° N., where there was a light N.Wly. breeze close to Africa. Further to the Wd. there was a fresh N.Ely. breeze, and, with No. 87, in 17° N. and 39° W., squalls in quick succession and rain, with dark gloomy weather all round the horizon.

Near the WEST INDIES (at Sombrero) the barometer had again fallen and was ·06 in. lower than at 0.43 p.m., 17th;* the wind had backed to N., the weather continued fine, but there was a high sea on the En. side of the island. The centre of the hurricane was probably about 400 miles to the Ed. of Sombrero at this time.

No. 117 was about 230 miles to the N.Ed. of Sombrero, and probably about 250 miles W.N.W. from the centre of the hurricane. The hurricane seems to have just commenced with her at the time of the Chart, as shown by the following quotation from her log:

> Noon (Greenwich time†). Took in all light sails and double reefed; blowing very hard and a heavy sea running from E.S.E.; wind N.N.E.

This was a brigantine from New York to Barbados, and therefore no doubt running to the Sd. It is manifest that she had got into a part of the sea which had for some time had an E.S.E. wind to the E.S.E. of it, causing the heavy sea from that quarter. It will be remembered that at the same time Sombrero had a high sea on the E. end of the island. These facts agree with the supposition that the hurricane was coming in from the E.S.E. Here then, at noon, we have a ship in about 21° 10′ N. and 60° 20′ W. just taking in her light sails to the first of the hurricane. Her log goes on to say:

		Barometer.	Wind.	Remarks.
18th,	3 p.m.	- -	- -	Wind increasing and sea running still heavier; furled all sails except close-reefed mainsail, and hove the ship to.
„	4 „	? 30·00	- -	Blowing still harder and a heavier sea running. Position 20° 50′ N., 60° 20′ W.
„	7 „	? 29·85		
„	8 „	? 29·79	N.N.E.	Took in the mainsail and bent main-trysail.
„	Midt.	? 29·59	North	Blowing still harder; lowered main-trysail down, set fore-topmast staysail, and kept before the wind. Position 20° 20′ N., 60° 20′ W.

* The barometer had really fallen more than a tenth during the 24 hours, but it was rising again at the time for which the Chart is drawn.

† It is very important for the reader to remember that all the times extracted from ships logs have been converted into Greenwich time for the convenience of comparison. For instance, in this case, Noon, Greenwich time, was 8 a.m. of ship's time. See the top and bottom of each Chart for the *local or ship's* time at certain meridians, when it was 0.43 p.m. Greenwich time.

	Barometer.	Wind.	Remarks.
19th, 2 a.m.	? 29·47	N.N.W.	
„ 3 „	? 29·45	N.W.	In fore-topmast staysail, set main trysails, and brought the ship to the wind on the port tack. Position 20° 7′ N., 60° 11′ W.
„ 6 „	? 29·50	West.	Position 20° 4′ N., 60° 3′ W.
„ 8 „	? 29·64	W.S.W.	
„ 11 „	? 29·88	S.W.	Position 20° 10′ N., 59° 49′ W.

In getting the above positions, it is supposed that the ship drifted with the wind 3 miles an hour when hove-to, and ran before the wind 7 miles an hour. We have no opportunity for testing the readings of the barometer, which were probably too high, but the changes are interesting.

NOTE.—No. 117 gave good data for fixing the position of the hurricane, as she was never so much hampered by it as to cease recording the barometer and direction of the wind, but the force of the wind was not alluded to after midnight, when she kept away before a "still harder" gale from North. At 6 a.m., 19th, in about 20° 4′ N. and 60 3′ W., her barometer had risen and the wind was W. As she was always able to carry sail, it seems right to conclude that she was never nearer the centre than 60 miles, and that the centre was in about 21° N. and 60° W. at 6 a.m., 19th. This position gives it a speed along its track to the W.N.W. of 12½ miles an hour, or 300 miles in 24 hours, from the position assigned to it on the 14th.

This day's Chart indicates that a steady N.E. Trade and fine weather can exist in front of a hurricane and within about 400 miles of its centre, where the only indications of bad weather were a S.Ely. or Ely. swell, and a slight fall of the barometer. About 900 miles to the Ed. of the hurricane, and probably much nearer it, there was a fresh N.E. Trade and clear weather.

The following extract from a log alludes to weather experienced between the hours of the Charts of the 18th and 19th.

On the 18th (supposed to have been about 4 p.m.) the barque "M. E. Lnd," from Cardiff, bound to Galveston, was in 22° N. and 60° W. with a gale and every appearance of a hurricane. Ship apparently hove to.

19th, 4 a.m. A terrific hurricane.

„ 6 a.m. Indications of a lull, and the vessel put before the wind. The hurricane increased in violence again, a heavy sea struck her, and she broached-to on the port tack; lower topsail blew to pieces. Ship hove on beam ends.

No. 142 was a sailing barque bound to the Nd.; she was probably about 500 miles to the N.Wd. of the centre of the hurricane, and in its track; the barometer was not recorded each day, though no doubt it was falling, but not so fast as that of No. 189 to the N.Wd. of her, which vessel was steaming to the Sd., whilst No. 142 was sailing away from the hurricane but being caught up by it.

About 4 p.m., the wind being N.byE., No. 142 tacked and stood to the Ed. for an hour, when the wind changed to E.N.E. and she tacked to the Nd. Had she not tacked at 4 p.m. but "kept away" with the wind on the starboard quarter it is probable that the wind would have backed to the N.Wd. and she would have escaped the worst of the hurricane.

The following are extracts from her log :—

	Wind.	Ship's Course.	Remarks.	
18th, 10 p.m.	E.N.E.	North.	Wind increasing with hard squalls and rain.	Took in all small sails
„ 11 „	N.E.byE.	N.byW.	A fresh gale ; double-reefed the topsails.	
19th, 1 a.m.	E.byN.	N.byE.		
„ 4 „	-	-	Strong gale with dull cloudy weather.	
„ 8 „	N.E.byE.	N.byW.	More moderate ; set whole topsails.	
„ Noon.	-	-	Strong wind and clear weather.	

NOTE.—Here is a case in which the wind and weather improved and sail was made in front of a hurricane, though it was advancing on the ship. Probably the barometer was giving good warning, though there is no remark in the log to prove that it was watched. The ship's average speed was nearly 6 knots when not under reefs, and 3 knots when under reefs.

No. 189 was 6° to the Nd. of Sombrero, and probably about 600 miles to the N.Wd. of the centre of the hurricane, she had an Ely. swell, it having been previously S.Ely., though her wind had been steady from the N.Ed. ; at midnight her wind was N.E. 5, the Ely. swell was heavy, and it rained. At 4 a.m. and 8 a.m., 19th, her barometer was 29·920, the lowest reading she experienced whilst under the influence of the hurricane ; at 8 a.m., 19th, the wind was N.byE. 3, weather fine, and a very heavy Ely. swell. This ship was steaming fast to the Sd., and at 0.43 p.m., 18th, (the time of the Chart) her barometer had fallen ·16 in. during the previous 24 hours; the Chart shows that she had cir.-c. from E.N.E.

Near BERMUDA the barometer had fallen about ·05 in. since the 17th, the wind was light N.Ely., and weather fine, though foggy at the island.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen, the wind was S.Ely., and the weather chiefly fine or cloudy ; Cay Sal had an overcast sky and rain. Jamaica reported thunder and lightning.

On the COAST OF AMERICA the barometer had risen generally, chiefly in the neighbourhood of the high pressure near Halifax ; the winds were Sly. or S.Wly. up to 40° N. ; further to the Nd. they circulated round the above-named high pressure with generally fine weather, but overcast where the wind was Ely. and blowing from the sea *towards* the land.

The INLAND WINDS OF AMERICA were from various quarters and light to fresh, with fine weather.

CLOUDS AND MOUNTAIN WINDS.—The red arrows over the sea show that cir. moved from N.N.E. over a S. wind in about 6° N. and 16° W. ; cir.-c. from E.N.E. over a N.N.E. wind in about 25° N. and 65° W. Besides the above, at 5.30 a.m. No. 192 in about 56° N. and 24° W. had cir.-c. from N.W., wind N.W., the Chart shows that this ship had steamed into the Wly. wind on the top of a ridge of pressure by 0.43 p.m. At 2.15 p.m. No. 200, in about 47° N. and 34° W. had cir. fast from S.W.byW., wind W.S.W. ; at 7.15 a.m. No. 181, in about 41° N. and 49° W., had cir. from S.E.byE., wind E.S.E., and at 3.15 p.m. cir. from S.W.byW., wind E.byN. ; at noon No. 178, in London, had upper clouds from the S.Wd., wind S.Ely.

In EUROPE Dovre had a moderate Sly. breeze when there was a strong N.N.W. breeze at Christiansund. Brussels, like London at noon, had clouds from the S.W. over a S.Ely. wind; Chaumont had a fresh S.Wly. breeze; St. Gotthard a fresh S. gale, and Julier a light S.Ely. air with clouds again from N. Munich had clouds from W., above a light Ely. air.

Over AMERICA the upper clouds were chiefly from W. or N.W., drawing more Sly. in the neighbourhood of Florida and the East Coast. On Mount Mitchell there was a fresh S.W. breeze whilst it was calm at the base. Mount Washington had a strong S.E. wind, which increased to a gale and lasted till 4 a.m. of the 19th (when it was raining heavily) and probably longer. At 9.43 p.m. of the 18th, the S.E. gale had a speed of 60 miles an hour. This S.E. gale was probably related to the area of high pressure near Nova Scotia; the ordinary winds at Mount Washington are Wly.

The ISOTHERMS are so similar to those of previous days that they do not call for a special remark.

A temperature of 82° is shown on the W. Coast of Africa, and one of 86° near Cuba; whilst 77° was experienced in the S.W. monsoon near the Equator, and 76° in the Gulf of Guinea.

AUGUST 19, 1873.

This day had the HIGHEST PRESSURE (30·43) in the neighbourhood of the Azores. There was also a pressure of 30·37 in the neighbourhood of Newfoundland, forming a ridge there which seemed to draw out the area of highest pressure in a N.Wly. direction.

There was the above-named ridge of high pressure to the Sd. of Davis Straits, another over the British Islands, and a third over Sweden, which with their intervening hollows had their corresponding S.Wly., Wly., and N.Wly. winds.

There was a branching of the wind off Cape Finisterre, and the N.E. TRADE was first shown off the Coast of Portugal; it was Nly. and N.Wly. to the Sd. of the Canaries. The S.W. monsoon extended to about 14° N., where it drew into a light Wly. wind. That part of the N.E. Trade which lay about 20° to the Ed. of the hurricane had become more Ely. than it was on the 18th, and had the force of a strong breeze; No. 87 (in about 19° N. and 40° W.) had still unsettled weather, it being gloomy, squally, and misty. No. 285 (near the West Indies) had a fresh E.S.E. wind with a N.E. swell. She was steaming to the N.N.E., and had experienced the wind S.E. 4 for the previous 16 hours, with lightning in the East at midnight of the 18th. The E.S.E. wind of No. 285, the S.S.W. wind of No. 117 (in about 20° N. and 60° W.), the Wly. winds at St. Thomas and Sombrero, the N.Wly. winds of Nos. 54 and 189, and the N.Ely. winds of Nos. 115 and 142 indicate that the air under the influence of the hurricane acted similarly to what it does where the N.E. and S.E. Trades meet near the Cape Verds.

Near the WEST INDIES (at St. Thomas and Sombrero) the barometer had ceased falling, the wind had backed to W., and the weather was fine. At St. Thomas the upper clouds were from N.W., whilst the lower were from W. the whole day. At this time the centre of the hurricane was probably nearly 250 miles to the N.Ed. of Sombrero. See

the bold black spot on the Chart. At 11 a.m., 20th, the barometer at St. Thomas and Sombrero had risen about ·05; at St. Thomas the wind was S.S.E. 1 to 2, weather fine, clouds from S.S.W.

No. 117 seems to have been about 100 miles S.S.E. from the centre of the hurricane; the following remarks are from her log:—

	Barometer.	Wind.	
19th, 2 p.m.	? 29·96	S.S.W.	(No force given.)
„ 4 „	? 30·04	„	„

Unfortunately the extracts from her log cease here.

No. 189 was more than 200 miles to the Wd. of the hurricane, her barometer had fallen ·11 in. in 24 hours as she steamed to the Sd., the weather was fine, and she had a very heavy Ely. swell. The following are extracts from her log:—

		Barometer.	Wind.		Remarks.
* 19th,	4 p.m.	†29·96	N.W.	4	Weather fine; swell very heavy, Ely.
„	8 „	29·95	W.	4	„ „
„	Midt.	29·98	S.W.	4	„ „
20th,	4 a.m.	29·96	S.byW.	4	„ „
„	8 „	29·95	S.	4	„ cir.-c. from S.E.
„	10 „	Arrived at St Thomas.			

At the island of Sombrero also the wind backed to S., the changes were as follows: 19th, 4 p.m., W. 3; 8 p.m., W.S.W. 3; 20th, 1 a.m., S.S.W. 3; 5 a.m. and 10 a.m., S. 3; Noon, S.S.E. 3; weather fine throughout. Eventually the wind backed into the N.E. Trade. These wind changes show how gradually the wind backed into the Trade.

No. 115 was in 24° 30′ N., 63° 20′ W., and probably rather more than 200 miles N.W. from the centre of the hurricane at about 4 p.m., 19th; barometer ? 29·90, wind N.N.E., force not given; ship running S.S.W., and gradually reducing sail until 11.45 p.m., when she was under bare poles, then hove-to on the starboard tack under reefed storm trysail. The following are extracts from her log:—

19th, Midt. Barometer 29·10, wind terrific from N.N.E. to N.

20th, 2.45 a.m. Vessel thrown on beam ends, cut away masts and she righted, but she was water-logged.

The crew remained on the wreck 17 days before they were picked up.

Allowing that No. 115 ran 56 miles to the S.S.W. between 4 p.m. and 11.45 p.m. of the 19th, when she hove-to, and that she drifted S.byW. 9 miles whilst hove-to from 11.45 p.m., 19th, to 2.45 a.m., 20th, when she was thrown on her beam ends, we get 23° 29′ N., 63° 45′ W. as her position at 2.45 a.m., 20th. Before considering the data from No. 115 we had fixed the position of the centre of the hurricane at 6 a.m., 19th, from the observations of No. 117, to be 21° N. and 60° W., and we had made out that it was travelling to the N.Wd. at the rate of about 12½ miles an hour, the curve in which it was supposed to have travelled trending N.W.byW. in this part. By taking N.W.byW. as its course, and 12½ miles an hour as its speed, we get 23° 24′ N. and 63° 53′ W. as the position of its centre at 2.45 a.m., 20th, which is

* To find the local time take four hours from the given Greenwich time.

† The barometer readings are from a verified instrument supplied by the Meteorological Office.

practically the same as the position of No. 115 when thrown on her beam ends. Hence this position and the speed of the hurricane per hour are confirmed by independent data.

No. 116 was a brig steering about S.S.W. The force of wind was not given at the time of the Chart. The following are extracts from her log:—

	Wind.	Remarks.
20th, 4 a.m.	N.N.E.	Increasing.
„ 8 „	„	A hurricane. Vessel hove down and doing best to save her.
„ Noon.	S.S.W.	„

No. 142 was about 300 miles N.W. from the centre of the hurricane, her log was quoted up to noon of this day in the remarks on the 18th. It will be remembered that she was steering to the N.byW. with a strong N.E.byE. breeze and clear weather after having had a strong gale and cloudy weather; this was very deceptive, as the hurricane was catching her up fast, and it is most probable that her barometer indicated this fact. The following are further quotations from her log:—

	Wind.	Ship's Course.	Remarks.
19th, 5 p.m.	N.E.byE.	N.byW.	Strong wind and clear weather.
„ 8 „	„	„	„ cloudy weather.
„ 9 „	N.E.	N.N.W.	
„ 10 „	„	„	Wind increasing, in jib and mizen.
„ 11 „	„	„	In second reefs in topsails.
19th, Midt.	N.E.	N.N.W.	Fresh gale with a cloudy sky and high cross sea running.
20th, 1 a.m.	„	„	In main-topmast staysail.
„ 4 „	„	„	Strong gale and heavy squalls.
„ 7 „	„	„	Mizen staysail blew away.
„ 8 „	„	„	Stowed mainsail and fore-topmast staysail.
„ Noon	„	„	A severe gale and high sea; stowed the foresail.

The ship averaged about five knots an hour in speed. Even at this time it is probable that she would have escaped the worst of the hurricane if she had "kept away," and brought the wind on the starboard quarter. The steadiness in direction of the N.E. wind, whilst it increased in force, ought to have convinced the captain that the hurricane was travelling towards him from the S.Ed.

At BERMUDA the barometer had fallen ·03 in. since the 18th, and the weather was still foggy. Nos. 234 and 267 do not record the state of the sea this day, so that there is no proof as to whether the S.Ely. swell had reached them. With No. 187, about 900 miles to the N.Wd. of the hurricane, the sea was smooth.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen slightly, the wind was chiefly light Ely., and the weather fine. From 11 p.m., 19th, to 7 a.m., 20th, No. 279 (lying at anchor at Nassau) had squalls and rain, wind from E.N.E. to E., with thunder and lightning. At 5 a.m. the rain was very heavy. The barometer was gradually falling.

On the COAST OF AMERICA the barometer had fallen generally, and risen in Newfoundland, as though the high pressure which was in the neighbourhood of Halifax on the 18th had travelled to Newfoundland. The map which is opposite to p. 992 of the

Report of the Chief Signal Officer, U.S.A., gives the track of an area of high pressure near Halifax on the 18th, which was travelling to the N.Ed. The winds were Sly. between 30° and 40° N., further to the Nd. they were variable, whilst over the sea to the Ed. they were affected by the area of high pressure in the neighbourhood of Newfoundland which has already been alluded to.

The INLAND WINDS OF AMERICA were chiefly affected by an area of low pressure in the upper Lake Districts.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. moved from S.W.byW. over an E.S.E. wind at a position S.E. of Newfoundland; cum. from W.byS. over a S.byE. wind in the Mediterranean; and cir. from E. over an E.byN. wind near Cuba.

It has already been remarked that at the island of St. Thomas (W. I.) the upper clouds were from N.W. the whole day, while the lower were with the wind, from W. They were influenced by the hurricane, and indicate that the changes caused by the passing of the hurricane took place sooner at the surface of the earth than in the upper regions of the air, this was probably caused by the greater friction at the earth's surface checking the onward movement of the air and diverting it more towards the hurricane.

In EUROPE Dovre still had a Sly. wind whilst it was Nly. at Christiansund; Chaumont and Julier had a light S.Wly., and St. Gotthard a light Sly. wind, whilst Sly. winds prevailed at the lower stations in the neighbourhood. Julier still had clouds from the N.

Over AMERICA the upper clouds were chiefly from the Wd. At Kingston, Canada, they were from N., at Charleston from S., and in the neighbourhood of Cuba from E. On the summit and at the base of Mount Mitchell it was calm. Mount Washington had a strong Wly. breeze.

The ISOTHERMS are similar to those of previous days.

A temperature of 80° is shown at St. Louis on the W. Coast of Africa and one of 86° near Cuba, whilst it was down to 75° at Elmina in the Gulf of Guinea.

AUGUST 20, 1873.

This day had the HIGHEST PRESSURE (30·40) to the Wd. of the Azores. The ridge of high pressure, which was in the neighbourhood of Newfoundland on the 19th, had moved further to the Ed. and was S. of Greenland on the 20th.

The wind was S.Wly. on the Wn. side of the ridge, and N.Wly. on its En. side; the N.W. wind extended from Greenland to 50° N. and 25° W.; further to the Ed., in the hollow of the wave, the wind was Wly., whilst over the British Islands and Western Europe it was S.Wly., blowing up the Wn. side of another ridge. In the hollow of the wave which lay over the British Islands there was a light Ely. air, which seems to have extended to the Faroe Isles.

Off Cape Finisterre the wind was W., branching S.W. to the Nd., and N.W. to the Sd. of that position. The N.E. TRADE was fresh along the North-west Coast of Africa,

and was drawn into a strong N.W. wind to the Ed. of the Cape Verds. In the centre of the Atlantic there was still a fresh N.E. Trade, and the weather was gloomy with No. 87, overcast with No. 224, and misty with No. 110.

Near the WEST INDIES No. 285 had a fresh E. wind and fine weather. At 8 a.m. she had experienced a S.Ely. swell. Sombrero and St. Thomas had a rising barometer, a light S.Ely. wind, and fine weather. At St. Thomas the clouds were coming from S.S.W. the whole day; at 10 p.m. the wind there changed to E.

NOTE.—The S.Ely. wind and S.S.W. direction of clouds seem to show that the N.E. Trade began to influence the lower air and to make it back to the Ed., whilst in the upper regions the air remained more under the influence of the hurricane.

No. 116 was a brig bound to Porto Rico. At noon of the 20th the wind changed suddenly from N.N.E. to S.S.W.; her position appears to have been 23° 54′ N. and 63° 48′ W. There appears to have been some doubt about this vessel's longitude; a speed of 12½ miles an hour would have placed the centre of the hurricane 60 or 70 miles further to the Wd. at this time, so that if No. 116 be right, the hurricane must have reduced its speed to the N.Wd. Equal weight has been given to Nos. 115 and 116 in endeavouring to fix the position of the centre of the hurricane, see the bold black spot on the Chart. No. 115 was water-logged, and kept no log after 2.45 a.m. of the 20th; so that she does not appear on this day's Chart; see the remarks of the 19th for particulars respecting her.

No. 142 had become hopelessly involved in the hurricane, and was hove to on the starboard tack. The following are quotations from her log, continuing from those quoted in the remarks of the 19th:—

	Barometer.	Wind.	Course.	Remarks.
20th, 1 p.m.	- -	E.N.E.	N. ½ W.	
„ 4 „		„	„	A furious gale, sea running heavily from N.E., and a high swell from E.S.E. Position by acct. 27° 30′ N., 64° 50′ W.
„ 5 „	? 29·80	„	N.N.E. to N.byW.	Gale, increasing to a hurricane.
„ 6 „	- -	„	„	Bent and set another mizen staysail.
„ 8 „	? 29·75	„	„	Fore-staysail blew away.
„ Midt.	? 29·65	„	„	Main-topsail blew away, wind and sea increasing, mizen-staysail blew away.
21st, 3 a.m.	? 29·40	„	„	Gusts awful, impossible to believe that it could blow so hard. Put cloths in mizen rigging. Hurricane intense in its fury. Jib-boom and topgallant masts now blown away.
„ 5 „	- -	S.S.E.	E.byS. to E.N.E.	A lull for ten minutes; tried to rebend mizen staysail, but could not in time. A sudden shift of wind to S.S.E.; ship now heading into a frightful sea.
„ 6 „	- - - - - - -			Two seas in quick succession broke on board, sweeping the decks, and burst in main hatch, &c. &c.

In the neighbourhood of BERMUDA, Nos. 234 and 267 (ships in company to the S.Wd. of that island) had a fall of ·09 in. in the barometer since the 19th, whilst it had only fallen ·03 in. at that island, and ·02 in. with No. 187 to the N.Wd. of it. About 6 p.m. 20th, No. 267 records a swell from the Ed., and about 8 p.m. No. 234 recorded a heavy swell from the S.Ed. At 5 p.m. No. 187 recorded a smooth sea, and at 9 p.m. a Sly. swell, so that the swell of the hurricane seems to have reached her when she was about 600 miles from its centre.

The register of the lighthouse keeper at Bermuda gives the following observations :—

	Barometer.	Wind.		Remarks.
20th, 10.20 a.m.	30·112	N.E.	4	Heavy swell on the shore, and breakers from S.E. on the S. side of the island. There were cir.-c. with fine weather.
„ 4.20 p.m.	30·119	E.	4	Cloudy, upper clouds cir.
„ 8.20 „	30·089	E.	4	Cir. still seen. Heavy sea on the shore, and breakers from S.S.E.
21st, 2.20 a.m.	30·084	E.	6	Cloudy, lightning S.S.W. „ „
„ 6.20 „	30·088	E.	6	Cloudy. „ „
„ 10.20 „	30·070	E.	6	„ „ „

The direction of the wind indicates that there was a slight circulation of wind round a small area of high pressure to the N.Wd. of Bermuda.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen; at the Bahamas and Cay Sal the fall amounted to ·09 in. in the 24 hours, but to a less amount further to the Wd.; the wind was Ely. to N.Ely and the weather generally fine, though it was misty at Nassau.

On the COAST OF AMERICA the barometer had fallen slightly between 30° and 35° N., but risen further to the Nd. The winds were Sly. from 30° to 39° N., but Nly. to N.Wly. further to the Nd.

The INLAND WINDS OF AMERICA were variable, except in the N.W., where they were influenced by the Sn. side of an area of low pressure.

CLOUDS AND MOUNTAIN WINDS.—The red arrows over the sea show that cir.-s. were moving from N.W. over a W. wind in about 55° N. and 35° W.; "very high mackerel sky" from W.S.W. over a S.S.W. wind in about 43° N. and 46° W.; and cir. from S. over an E.N.E. wind near Cuba. The upper clouds from S.S.W. at St. Thomas have already been remarked upon. See remarks near the West Indies.

In EUROPE, Dovre still had a Sly. wind, whilst it was Nly. at Christiansund. Chaamont had a light W., St. Gotthard a strong N., and Julier a very light S.W. wind. Julier still had clouds from the Nd., Munich had clouds from W. above a fresh S. breeze.

Over AMERICA the upper clouds were chiefly from the Wd. or S.Wd.; on the South-east Coast they were more Sly. than elsewhere, whilst they were more Ely. in the neighbourhood of Florida and Cuba. Mount Mitchell had a very light N.Wly. wind on the summit, and calm at its base. Mount Washington had a strong N.W. breeze, and upper clouds from the same direction.

The ISOTHERMS resemble those of previous days.

A temperature of 84° is shown at St. Louis on the W. Coast of Africa and of 86° at

St. Thomas in the W. Indies; whilst 86° was also experienced in the Gulf of Mexico. Readings below 80° were recorded in the S.W. monsoon near the Equator.

AUGUST 21, 1873.

This day had the HIGHEST PRESSURE (30·33) to the Wd. of the Azores, but it was 30·29 in Labrador and 30·27 at Boston, United States.

To the Nd. of the area of highest pressure there was a ridge of high pressure extending S.Ed. from Davis Straits; from its En. side a N.Wly. wind blew into the hollow to the Ed. of it, and became more Wly. as it advanced to the Ed.; whilst in the neighbourhood of Newfoundland the above-named N.Wly. wind was drawn into a N.Ely. wind which blew along the S.En. side of the area of high pressure which existed on the Coast of America. There were very few observations to the Wd. of the British Islands, but the direction of the wind indicates that there was a large hollow of low pressure there. Over the North Sea there seems to have been an area of low pressure with light to strong breezes circulating round it.

The usual branching of the wind was shown to the Wd. of Portugal, and a fresh N.E. TRADE was blowing in about 32° N., which amounted to a gale near the Canaries. To the Ed. of the Cape Verds the N.E. Trade and S.W. monsoon seem to have met and formed a light Wly. wind. In about 53° W., No. 285 had a rising barometer, a strong E.N.E. breeze with cloudy weather, rain, and a disturbed sea; she was crossing that part of the sea where the hurricane had been on the 18th.

Near the WEST INDIES the barometer had risen, the wind had backed to the Ed., and the weather was fine. No. 189 left St. Thomas for Bermuda at 2.20 p.m., the wind was still E.S.E. 4, and the weather fine: she experienced a Nly. swell which was no doubt produced by the hurricane. The circ.-c. from S.E. with her is not a very certain observation, as it was a dittoed entry.

No. 116 seems to have just got a moderating Sly. wind, but the observation is not very clear. At 4 p.m. she had a S.S.E. wind, and was steering N. for Bermuda.

No. 142 had a frightful Ely. sea at the time of the Chart; she suffered so much from the two heavy seas which came on board about 6 a.m., 21st, that the whole crew were employed in trying to prevent water from getting into the ship in the various parts where she was damaged. The wind is supposed to have continued from the S.Ed., and the ship to have drifted to the N.Wd. about 54 miles in the 24 hours. The following are quotations from her log:—

21st, about 4 p.m.	Barometer ? 29·40. Hurricane intense in its fury. Fore staysail blew adrift, set the mizen staysail.
„ about 5 p.m.	Hurricane, if anything, moderating, but a fearful sea running.
„ 6 p.m.	Bent a fore-topmast staysail and set it.
„ 7 „	Barometer ? 29·50. Judged the ship to have about 6 feet of water in her.
22nd, 4 a.m.	Water gaining, ship like a log in the water.
„ 8 „	Kept the ship away for Bermuda.
„ Noon.	Found 8 feet of water in the hold.

No mention is made of the direction of the wind until 5 p.m., 22nd, when it is recorded as S.

No. 118 gives the following data:—

	Barometer.	Wind.	
21st, 3.30 p.m.	? 29·20.	Wind shifted to E. and E.S.E.	Hurricane with terrific force.
„ 10.30 „	? 29·15.		
22nd, 6.30 a.m.	—	Wind S.E.	

No. 121 was close to the E. end of Bermuda, and reported it blowing strong from E. with a rough sea.

Nos. 234 and 267 were S.W. from Bermuda and in company; the following extracts from their logs will be interesting, the barometer readings are from No. 234:—

	Barometer.	Wind.	Remarks.
21st, 4.30 p.m.	29·900	E.byN. 6 to 9.	Squally with a heavy sea.
„ 10.30 „	29·765	E. 7 to 9.	„
22nd, 4.30 a.m.	29·735	„ 7 to 10.	Squally with showers.
„ 8.30 „	29·665	E.S.E. 8 to 10.	Heavy squalls.

This was the time of lowest barometer with both ships during the S.Ely. gale, it was slightly lower on the 24th with a gale from S.W. and W. Both ships were heading to the Nd. and N.Ed. under a small amount of sail and steam, and making from one to two knots an hour. No. 234 records that she was drifting at about this rate to the N.Wd. At 9.30 a.m., 22nd, the wind was S.Ely. 8 to 10.

The register of the lighthouse keeper at BERMUDA gives the following data:—

	Barometer.	Wind.	Remarks.
21st, 4.20 p.m.	30·064	E.S.E. 6.	Heavy sea on the shore, and breakers; stormy looking weather.
„ 6.20 „	—	—	Heavy gale or "storm" passing S.W.
„ 8.20 „	30·020	E.S.E. 9.	Dark stormy looking weather, heavy sea on the shore.
22nd, 2 a.m.	—	—	Squally.
„ 2.20 „	30·005	S.E. 9.	
„ 6.20 „	29·980	S.E. 6.	
„ 10.20 „	29·980	S.E. 6.	Heavy sea on the shore.

This was the lowest barometer experienced at Bermuda until the 24th, when the hurricane seems to have been to the Nd. of the island. It will be seen that Nos. 234 and 267 got their lowest pressure at 8.30 a.m., 22nd, or about the same time as Bermuda.

The direction part of the anemometer on Maria Hill, Bermuda, was out of order at this time, but the greatest speed of the wind was recorded between 4 and 8 a.m. of the 22nd, when it was from 33 to 34 miles per hour, so that Nos. 234 and 267, the barometer at the lighthouse, and the anemometer indicated that on the 22nd the centre was nearest to Bermuda at about 8 a.m., though the barometer was lower, and therefore the centre was probably still nearer that island on the 24th after recurving. This lower barometer may, however, have been caused by the sudden extension of the hurricane noticed on the 24th.

No. 123, to the N.Wd. of Bermuda, was a schooner from Baltimore to Bermuda, she made the following record: "August 21st; civil time, commences with freshening breeze " and heavy passing clouds, wind inclining Easterly, a heavy swell from S.E., and *rain*." On the 20th the wind had been S.S.E. to S.S.W., the "inclining Easterly" has been

entered on this day's Chart as East. The following are further quotations from her remarks:—

21st, 3 p.m. Stowed all light sails.
„ 5 „ Wind N.E. and increasing to a gale; barometer ? 29·98in. and falling. Position 33° 46′ N., 71° 14′ W.
„ 7 „ Gale increasing fast.
„ 11 „ Gale still increasing.
22nd, 5 a.m. Gale increasing; barometer ? 29·78 and falling.

No. 187, to the N.Wd. of No. 123, a sailing ship bound to New York, had a Sly. swell, which was no doubt caused by the hurricane, her wind remained N.Ely. with very fine weather and very little cloud; her barometer gradually fell. She had a squall at 9 p.m., and showers at 5 a.m., 22nd, but followed by beautiful weather, and the sky almost cloudless.

No. 86 was about 700 miles E.N.E. from Bermuda, and had a fresh S.S.Ely. gale; it seems clear that this wind was little if at all influenced by the hurricane, but that it was affected by another area of low pressure to the Wd. of it. She was a leaky schooner, and afterwards abandoned. The following are extracts from her log:—

21st, 3.30 p.m. Heavy gale from the S.S.Ed.
„ 7.30 „ Gale about its height with fearful sea, ship's head E.N.E.
„ 8.30 „ A sea over the stern and another amidships filled the decks up to the rail.
22nd, 3.30 a.m. Gale taking off and backing round to the Ed.
„ 10.30 „ Wind backed to N., wore ship to the Ed.

The changes of wind indicate that the lowest pressure had passed S. of her, on its way to the Ed. or N.Ed.

Near the BAHAMAS the barometer had risen, whilst it seems to have been steady in the neighbourhood of CUBA AND FLORIDA, the wind was generally Ely., drawing Sly. in the Gulf of Mexico, and the weather generally fine.

On the COAST OF AMERICA the barometer had risen very decidedly. The wind was N.E. to S.E. between 30° and 35° N., Sly. between 35° and 40° N., and generally N.Ely. further to the Nd. The weather was generally cloudy or overcast, with fog in some places.

The INLAND WINDS OF AMERICA were from various quarters, though N.Ely. seem to have prevailed.

CLOUDS AND MOUNTAIN WINDS.—There were no upper cloud observations OVER THE SEA.

In EUROPE, Dovre had a calm; Chaumont and Julier very light S.Ely., and St. Gotthard a fresh Sly. wind; the two latter had clouds from the Nd., whilst Munich had clouds from the Wd. above a moderate Ely. breeze.

Over AMERICA the upper clouds were chiefly from the S.Wd. or Sd. Mount Mitchell had also a S.Wly. wind. These facts indicate a remarkable drift of upper air to the N.Ed.; it will be seen that this is towards the area of high pressure near Boston. Mount Washington had a light Ely. wind, whilst Eastport had upper clouds from the N.E., so that they were also moving *towards* the area of high pressure.

The ISOTHERMS resemble those of previous days.

A temperature of 84° is shown on the W. Coast of Africa, and one of 85° at Cay Sal, North of Cuba, whilst a reading of 75° was recorded near the Equator.

AUGUST 22, 1873.

This day had the HIGHEST PRESSURE (30·33) with No. 5 in about 51° N. and 39° W., but it was nearly as high with No. 185 to the Wd. of the Azores.

To the Nd. of the area of highest pressure there was a ridge of high pressure extending S. from Greenland. This looks as though the ridge which extended S.E. from Davis Straits on the 21st, had advanced to the Ed.; it had Sly. winds on its Wn. side and N.Wly. winds on its En. side. There seems to have been another ridge of high pressure over Norway, with corresponding winds.

The N.E. TRADE was not shown to the Nd. of 35° N., it extended to the Cape Verds; in the centre of the Atlantic it drew more Ely., whilst with No. 287, in about 25° N. and 54° W., it was E.S.E. This vessel was steaming to the S.Wd., and had previously experienced a S.E. wind.

Near the WEST INDIES the barometer was steady, the wind moderate to light from E.N.E., and the weather fine.

No. 189, to the Nd. of St. Thomas, was steaming to the Nd.; she still had a Nly. swell, which became N.Wly. at 8 p.m.; the cir.-e. from N.E. is supposed to have been dittoed since 8 a.m., but there is some doubt about it.

No. 142 was in such sad plight that no direction of wind was given between S.E.byS. at 5 a.m., 21st, and S.byE. at 4 p.m., 22nd, hence S.S.E. has been taken and the force is estimated from the remarks. She was leaky, eventually cut away her masts, and was towed into Bermuda.

Nos. 234 and 267 differ a couple of points in the direction of their wind; the following are extracts from No. 267:—

	Barometer.	Wind.	Remarks.
22nd, 8.30 p.m.	29·842	S.S.E. 6 to 8	Weather squally.
23rd, 0.30 a.m.	29·905	S.byE. 5 to 7	„ „
„ 4.30 „	29·965	S.S.E. 7 to 6	„ „
„ 8.30 „	29·955	S. 4 to 6	„ „

The register of the lighthouse keeper at BERMUDA gives the following data:—

	Barometer.	Wind.	Remarks.
22nd, 4.20 p.m.	30·067	S.S.E. 6	Heavy sea on the shore.
„ 8.20 „	30·038	„	Sea going down.
23rd, 2.20 a.m.	30·048	„	
„ 6.20 „	30·078	„	Dark cloudy weather.
„ 10.20 „	30·078	„	Sea gone down. Dark clouds round horizon.

The anemometer at Bermuda gave an average speed of about 25 miles an hour between the 22nd and 23rd; the direction by occasional eye observations was S.E.

No. 123 (N.W. of Bermuda) was hove-to on the port tack; she gives the following remarks:—

22nd, 7 p.m. Burst a close-reefed main topsail, laying-to under a close-reefed storm trysail. Fearful sea from N.E. and S.E.
„ Midt. Barometer ? 29·28.
23rd, 1 a.m. Barometer steady, wind lulled.
„ 4 „ Calm, sea going down fast.
„ 5.30 „ A light breeze from S.W.byW.
„ 9 „ Barometer falling, blowing strong, sea rising fast; hove to on starboard tack. The gale increasing fast.

No. 126 (E.N.E. from No. 123) records E. in the direction of wind column throughout the 24 hours, but in the remarks about the time of the Chart for the 22nd, he says: "Ending with strong breezes and threatening weather from S.E." It is difficult to say whether the S.E. alludes to the wind, or the direction in which threatening weather is seen.

No. 127 (N.E. from No. 126) gives a mere extract from the ship's log, as follows:—

22nd. Very high sea from S.E., wind light from E. to S.E.

No. 266 (N.W. from No. 127) was bound from Halifax to Nassau, her wind was steady at S.E.byE. but increasing, and she was steering S.W.byS.; she averaged about seven knots an hour until about 7 a.m. of the 23rd, when she hove-to on the port tack. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
23rd, 0.30 a.m.	29·97	S.E.byE. 5 to 6	Heavy sea from S.E. and squally.
„ 4.30 „	29·88	„ 8	„ „
„ 8.30 „	29·72	„ 10	Very heavy squalls and sea from S.Ed.

The wind was recorded as steady from S.E.byE. from 5.30 a.m., 22nd, until 4.30 p.m., 23rd, the barometer gradually falling, and the wind gradually increasing until it reached force 11. This is one of those difficult cases in which a ship was in front of a hurricane which had recurved and was moving to the N.Ed. The steadiness of the wind shows that the hurricane and ship were meeting, whilst the log of the 23rd shows that the centre passed pretty close to, but on the En. side of the ship. With these facts before us it seems clear that if she had stood to the N.W.d. on the morning of the 23rd, keeping the wind on the starboard quarter, and thus altering the course more to the Wd., as the wind drew more Ely, she would have increased her distance from the centre, and probably escaped the worst part of the hurricane altogether.

No. 130 (W.S.W. from No. 266) was standing to the S.Ed.; we have only her track on a Chart, with the wind and barometer at various hours. The following are taken from the Chart:—

	Barometer.	Wind.	Position.	Remarks.
22nd, Midt.	?29·79	N.N.E. 6 to 7	34° 10′ N., 72° 20′ W.	The barometer had fallen ·26 in. in 10 hours
23rd, 4.45 a.m.	?29·61	N.W. 7	33° 38′ N., 71° 50′ W.	
„ 7.45 „	?29·53	N.N.W. 9 to 10	33° 30′ N., 71° 42′ W.	From this time she steered about S.byE. and increased her distance from the hurricane.
„ 11.45 „	29·69	N.W. 4 to 5	33° 2′ N., 71° 36′ W.	

No. 187 (N. from No. 130) had fine weather, with scarcely any cloud, but a heavy Sly. swell, the sea being much discoloured. The following are extracts from her log:—

	Barometer.	Wind.	
23rd, 1 a.m.	30·05	N.E.½E. 2.	Weather very fine, with dew, but no cloud; a mountainous swell like a storm wave before a hurricane. Ship steering N.N.W.
„ 9 „	30·01	„	Same weather but more cloud, and a fearfully heavy swell from S.E. Captain says, "Surely there must be a hurricane near, although the sky looks very fine light blue."

NOTE.—It will be seen that, in spite of this very fine weather, No. 187 was experiencing the wind of the outer verge of the hurricane, and that her wind backed to N. and N.W. as the hurricane passed to the Ed. of her, the N.Wly. wind blowing as a fresh gale as the ship stood to the N.Ed. after the hurricane.

No. 86, about 730 miles to the N.Ed. of Bermuda, it will be remembered, had just experienced a gale backing from S.S.E. through E. to N.; the force of the wind at the time of the Chart is not very clearly shown in the log, it seems possible that it may have been greater than 7. The following are extracts from her log:—

	Wind.	Remarks.
22nd, 5.20 p.m.	N.W.	Weather finer, sea still running heavily.
23rd, 4.20 a.m.	W.N.W.	Light wind, with heavy swell.

No. 22, to the N.Ed. of No. 86, in about 45° N. and 44° W., and steaming slowly to the E.N.Ed., gave the following remarks:—

22nd, 11 p.m. Strong S.E. gale with terrific squalls of wind and rain.
23rd, 3 a.m. No abatement in the gale.

NOTE.—At 8 p.m., 23rd, the gale had increased to a perfect hurricane. It did not moderate until 3 a.m., 24th, when it veered to the Sd. and S.Wd.

These vessels were evidently experiencing the winds of another cyclonic circulation, indicating that the atmosphere was in a very disturbed state. The Chart for the 23rd shows that there were three simultaneous cyclonic systems of wind blowing on that day.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen slightly, the wind was generally Ely., and the weather fine. At Nassau, Bahamas, there was a slight swell on the bar, which became heavy on the following days; this was most probably caused by the N.Ely. wind of the hurricane which was then to the N.Ed. of those islands. Before this date the sea had been recorded as smooth.

On the COAST OF AMERICA the barometer was steady to the Sd. of 35° N., but had fallen further to the Nd., the fall increasing as the latitude is increased, and amounting to about a tenth of an inch in 45° N. To the Nd. of 45° N. the fall decreased again. The wind was generally Sly. between 35° and 45° N., although the N.Ely. wind of the hurricane was within about 100 miles of the coast. The weather was generally fine up to 40° N., but overcast to the Nd. of that parallel.

The INLAND WINDS OF AMERICA were from various quarters.

CLOUDS AND MOUNTAIN WINDS.—The red arrows over the SEA show that cir. were moving from the Nd. above a Wly. wind to the Ed. of the Azores; cir.-c. from N.N.E. over an E.N.E. wind near the Island of St. Thomas; and cir.-s. from N. over a N.Ely. wind off the South-east Coast of Newfoundland.

In EUROPE, Dovre had again a Sly. breeze when the wind was Nly. at Christiansund; Chaumont had a light S.Wly., St. Gotthard a fresh Sly., and Julier a very light S.Ely. breeze, with light S.Wly. winds prevailing near.

Over AMERICA there were very few upper cloud observations, and they were from various directions; the wind both at Mount Mitchell and Mount Washington was N.Wly., with the latter it was strong.

The ISOTHERMS are very similar to those of previous days.

On the W. Coast of Africa, Goree had a temperature of 84°, whilst at St. Louis it was only 77°; 84° is also shown in the neighbourhood of the W. Indies, whilst 74° was recorded near the Equator.

AUGUST 23, 1873.

This day had the HIGHEST PRESSURE (30·33) in about 28° N. and 38° W. At the same time there was a pressure of 30·31 in the Lake District of America. There was also a ridge of high pressure extending N.N.W. from the Azores, which had an area of low pressure on each side of it, where there were almost cyclonic winds. The S.Ely. and N.Wly. winds in the more western one, attained the force of a strong gale. The S.Ely. wind of one system was within 120 miles of the N.Wly. wind of the other, having the narrow ridge of high pressure between them.

The N.E. TRADE was first shown in about 31° N., and extended nearly to the Cape Verds. In the neighbourhood of the area of highest pressure the wind was light and variable, whilst further to the Wd. it was N.Ely. and then S.Ely.

At Sombrero (WEST INDIES), the barometer had risen, the wind was fresh from E.N.E., and the weather cloudy and misty.

No. 189, in about 25° N. and 65° W., was steaming to the Nd., she had a fresh S.Ely. wind which seems to have been a drawing of the N.E. Trade towards the hurricane, and a N.Wly. swell which was no doubt from the N.W. wind of the hurricane; her barometer was rising and the weather was fine.

The register of the lighthouse keeper at BERMUDA gives the following data:—

	Barometer.	Wind.		Remarks.
23rd, 4.20 p.m.	30·064	S.	6	Cloudy and hazy.
„ 8.20 „	30·022	S.	9	„ „ Wind increasing.
„ 10.20 „	—	S.		Hard gales.
24th, 2.20 a.m.	29·990	S.	9	Cloudy and hazy.
„ 6.20 „	29·930	S.W.	9	
„ 10.20 „	29·930	W.S.W.	9	Thick and hazy; dark clouds round horizon. From this time to 4.20 p.m. the barometer was nearly steady; the wind was W. 9 at 4.20 p.m., and the barometer rose after that hour.

The anemometer at Bermuda shows that the velocity of the wind rose to 30 miles an hour at 5.20 p.m., 23rd, and was 35 miles an hour at 11.20 p.m., keeping at nearly the same speed until 4.20 a.m., 24th, from which time it averaged over 30 until 10.20 a.m., 24th, after which time it gradually decreased. The direction part of the anemometer was out of order, and the only eye observation given is South, at 9.20 p.m., 23rd.

NOTE.—There can be no doubt that if Bermuda had been in telegraphic communication with America the existence of this hurricane might have been made known on the 20th, and also the fact of its having recurved to the N.Ed. on the 23rd, when, knowing the existence of the high pressure in the Lake District, and that its track to the Ed. would cause it to meet the hurricane, the heavy N.Ely. gales would have been expected, and so far as possible provided against.

No. 121, see lower left-hand corner of Chart, was about 15 miles east of Bermuda. The following are extracts from her log :—

23rd, 9.20 a.m. Wind changed from S.S.E. to S.
„ 3.20 p.m. Took a pilot and ran in; wind breezing up again and squally from S.S.W.
„ 10.20 „ Dull gloomy-looking weather, with a strong gale and squally.
24th, 8.20 a.m. Wind hauled more to the Wd. Vessel commenced to drag. Let go second anchor.

Nos. 234 and 267 were N.N.W. from Bermuda and hove-to; they were so close that both observations are not given on the Chart, but they will be found in Appendix A. The following are extracts from the log of No. 267 :—

	Barometer.	Wind.		Remarks.
23rd, 8.20 p.m.	29·844	S.	5 to 7	In squalls 8.
24th, 0.20 a.m.	29·852	S.S.W.	7 to 8	No. 234, had barometer 29·765 at this time showing a fall of ·14 in the 4 hours, her wind was S. 6 to 8.
„ 4.20 „	29·742	S.W.	8 to 11	Very heavy squalls.
„ 8.20 „	29·722	W.	9 to 11	No. 234 had barometer 29·678 at this time; wind S.Wly. 7 to 9.

No. 234 recorded the barometer hourly, and had the lowest at 6.20 and 7.20 a.m. of the 24th, when it was 29·645 with a S.Wly. wind 8 to 10, after which the barometer rose and the wind decreased. Throughout, No. 267 recorded the wind as more Wly. and generally stronger than No. 234.

No. 126, N.W. from Bermuda, was hove-to on the starboard tack, having just wore ship from the port tack. She gives the following remarks :—

	Barometer.	Wind.	Remarks.
23rd, 4.30 p.m.	? 29·7	S.E.	Heavy gale. A heavy cross sea and thick sky. Position 34° 5′ N., 67° 20′ W.
„ 10.30 „	? 29·3	S.E.	Hurricane.
24th, 2.30 a.m.	Rising	S.	
„ 4.30 „	? 29·5	W.N.W.	Heavy squalls. The wind shifted suddenly to W.N.W., causing a tremendous cross sea.
„ 8.30 „	-	-	Sea commenced to subside; bore up for Bermuda. Gibbs Hill light-house bearing S.E.¼S. distant 170 miles; position 34° 26′ N., 67° 1′ W.

No. 123, to the Wd. of No. 126, was hove-to on the starboard tack. She gives the following remarks :—

	Barometer.	Wind.	Remarks.
23rd, 4.40 p.m.	? 29·08	- - - - -	Lat. 33° 25′ N., long. 69° 49′ W.
„ 8.40 „	? 28·88	S.W. by W.	Blowing fearfully.
„ 9.40 „	? 28·78	? S.W. by W.	It was blowing with such force as to smooth the sea. There was rain, and the barometer was steady.
24th, 0.40 a.m.	Rising.	- - - - -	Decreasing.
„ 4.40 „	? 29·58	Inclining Wly., force about 7.	Sea decreasing. This was followed by a moderate W. wind.

NOTE.—These remarks, compared with those on the 22nd, show that this schooner after passing from a heavy N.E. gale into a calm, and then getting a heavy S.W. by W. gale, had a falling barometer when it was apparently much lower than when she was becalmed. Perhaps the gale intensified and spread to the Sd. as well as to the Nd., which latter fact seems to be proved by the Chart of the 24th.

No. 266, to the N.Ed. of No. 123, was still hove-to on the port tack, the direction of wind was still steady from S.E. by E., though she had very severe squalls with heavy rain. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
23rd, 4.30 p.m.	29·28	S.E. by E. 10 to 11.	Very heavy sea, and squalls from S.E. by E. Position by D. R. 34° 50′ N., 68° 31′ W.
„ 5.30 „	29·20	E. by N. „	
„ 6.30 „	29·15	E.N.E. „	
„ 7.30 „	29·10	N.E. „	
„ 8.30 „	29·10	N.N.E. „	Very heavy sea and squalls.
„ 9.30 „	29·08	North 12.	Terrific squalls from N.E. with torrents of rain, the sea one confused mass of surf. Shipped several heavy seas over the lee rail; engines pumping ship; hands baleing water overboard with buckets.
„ 10.30 „	29·12	N. by E.	
„ 11.30 „	29·36	N.N.W. 11.	
24th, 0.30 a.m.	29·48	N. by W.	
„ 1.30 „	29·58	N.N.W.	
„ 2.30 „	29·65	N.W. by N. 10.	Wind moderating.
„ 4.30 „	29·74	- - -	Wind and sea moderating.
„ 5.30 „	29·80	W. by N. 8.	Tacked under steam and made more sail. Still squally.
„ 6.30 „	29·83	N.W. 6 to 7.	Head W.S.W.

The barometer continued to rise gradually, the wind continued from N.W. and gradually decreased in force, with fine weather. This ship carried 256 yards of canvas throughout the hurricane. The Navigating Officer's remark book says:

"Between 4.30 and 8.30 p.m. 23rd, occasional lulls took place, with the sun showing overhead at intervals, but heavy dull clouds kept banking up all round. Barometer at 8 p.m. 29·08, the lowest reading. 9 p.m. The barometer went up to 29·15 for a few minutes, but sank again to 29·10; and at 9.30 p.m. the heaviest squall was experienced with the whole force of 12 from the North, barometer 29·10."*

* In making these quotations the ship's time has been converted into Greenwich time, as in all other cases, the nearest ten minutes being considered sufficiently near. The best correction possible has also been worked out for the barometer, which was an aneroid.

No. 130, S.W. from No. 266, represents the last observation quoted in the remarks of the 22nd, as no other observations were given.

No. 128, to the Nd. of the hurricane, was a mail steamer on her way from New York to Bermuda. The following are quotations from her log:—

23rd, 11.20 a.m. Hove-to on starboard tack to determine the bearing of centre and track of the storm. Wind supposed to have been E. by S.

„ 1.20 p.m Having been hove-to for two hours, and finding the wind not to have veered at all, but the barometer to have fallen to ? 29·80 (it having stood at ? 29·94 when last read) supposed the ship to have been in front of the advancing storm, so ran her N.W.byW., the wind being a little on the starboard quarter.

„ 4.40 „ Barometer ? 29·94. Wind and sea moderating, squalls less frequent. Lat. 37° 40′ N., long. 70° 6′ W.

„ 4.40 „ to 24th, 4.40 a.m. The barometer continued steady, during which time, as the wind backed to the Nd., the ship steered W.N.W., W., W.S.W., S.W., and South, which course she was steering at 4.40 a.m., 24th), when the wind was N.by W., more moderate, without squalls, and weather clearing. After this the ship resumed her course to S.S.E. ½ E., the barometer rising very gradually.

NOTE.—This ship, after heaving-to and discovering that she was in front of the storm and in its track, ran, keeping the wind a little on her starboard quarter, until she got into the N.Wly. wind on its S.Wn. side, where she was safe, and had a fair wind for Bermuda. This was no doubt exactly the thing to have done, and the rule of running with the wind on the starboard quarter seems to hold good for all ships known to be in front of a Nn. hemisphere hurricane and on its track. Of course it is supposed that the ship has sea room for running.

No. 171, to the N.Ed. of Bermuda, was sailing to the E.N.E. The following are extracts from her log:

	Wind.	Remarks.
24th, 5 a.m.	S.S.Ely.	Fresh breeze and cloudy, took in the royals.
„ 8 „	„	Increasing wind, in topgallant sails.
„ 10 „	„	Fresh gale, heavy sea making.
„ 11 „	„	Reefed topsails and courses.
„ Noon	„	Hove-to under lower topsails. Strong gale and tremendous sea, which washed everything off port side of deck. Took in lower foretopsail.

No. 129, to the N, of No. 171, was a barque bound to the Ed.; she had experienced a S.Ely. swell since the 19th. On the 20th, in about 39° N. and 66° W. she had a short and quick S.Ely. swell and had been drifted 24 miles to the N.N.W., though the wind was light S.Wly. The current was possibly the effect of the S.Ely. wind of the hurricane.

The following remarks are from a rough abstract of her log:—

	Barometer.	Wind.	Remarks.
23rd, 4 p.m.	? 30·10	N.E.	Light baffling airs and fine, with a heavy sea setting up from the Sd.
24th, 4 a.m.	? 30·00	S.S.E.	Wind increasing, with heavy sheet and one flash of chain lightning. No lightning after this time.

No. 187, near New York, gives the following remarks:—

	Barometer.	Wind.	Remarks.
24th, 1.30 a.m.	29·95	N.W.byN. 6 to 7.	Wind freshened up in a moment, and blew some of our light sails away, ship steering to the N.Ed. It came without warning. Note.—This was the lowest barometer experienced by No. 187.
„ 5 „	29·98	„ 4 to 8.	Wind increasing rapidly.
„ 9 „	29·97	N.N.W. 8.	Fresh gale and clear. Very high and turbulent sea. Pilot had only once seen such a swell, which was followed by a heavy hurricane in New York.

No. 97, in about 41° N. and 65° W. was steaming 13 knots an hour to the Wd., whilst No. 101, a little to the Wd. of her, was steaming about 11 knots an hour to the Ed.; they passed each other at about 2.45 p.m. of the 23rd. The following are extracts from the log of No. 97:—

	Barometer.	Wind.	Remarks.
23rd, 4.30 p.m.	30·01	S.Wly. light.	Clear weather.
„ 6.30 „	29·96	Calm.	
„ 8.30 „	29·92	Nly. light airs.	„
24th, 0.30 a.m.	29·82	„	Dense fog.
„ 4.30 „	29·83	N. by W. 6.	Overcast.
„ 6.30 „	29·79	„	„
„ 8.30 „	29·82	„	Clear.

Note.—After this time the barometer rose, and the wind became slightly more Wly. and freshened a little, but the weather was fine.

The following are extracts from the log of No. 101:—

	Barometer.	Wind.	Remarks.
24th, 2.20 a.m.	? 30·00	Calm.	
„ 3.50 „	? 29·90	N. by W.	A sudden shift of wind to the Nd., squally, with vivid lightning heavy thunder, and pouring rain.
„ 8.20 „	? 29·84	N.E.byN.	Moderate, weather overcast.
„ 9.20 „	? 29·72	E.N.E.	
„ 11.20 „	- -	S.S.E.	
„ 0.20 p.m.	- -	„	Fresh breeze, with a Sly. sea.

It will be seen in the remarks of the 24th that No. 101 steamed past the Nn. side of the hurricane and hove-to, or steamed nearly head to wind, whilst its centre was passing to the Wd. of her.

Near the Bahamas, Cuba, and Florida the barometer had generally risen, the wind was N.E. to East, and the weather fine. At Nassau there was a heavy swell on the bar, caused no doubt by the hurricane.

On the Coast of America the barometer was steady to the Sd. of 33° N., but further to the Nd. it had fallen, the fall gradually increasing as the latitude increased, and amounting to nearly ·2 in. in the neighbourhood of Nova Scotia and Newfoundland. The wind was S.Wly. to Wly. between 30° and 35° N., S.E. and Nly. between 35° and 40° N., whilst it was chiefly light Sly. to the Nd. of 40° N. and over the sea in

the neighbourhood of that coast. This part of the sea was immediately to the Nd. of the hurricane, and, it will be seen, felt its influence in a sudden and remarkable way on the following day.

The coast in the neighbourhood of New York was warned of approaching bad weather at 4 a.m., 24th, but this warning was owing to the fact that their excellent system of signals showed that an area of high pressure was moving to the Ed. from the Lake District, and that the barometer was falling on their coast, causing strong N.Ely. winds. They do not seem to have been aware that a hurricane had been moving to the Nd. from St. Thomas for five days, and was at this very time sending such a mountainous swell on their coast that the pilot of a ship entering New York stated that he had only once before seen such a swell, which was followed by a hurricane in New York.

The INLAND WINDS OF AMERICA were very much influenced by an area of high pressure in the Lake District, which high pressure will be seen to have become more intense and to have advanced to the Ed. on the 24th, causing the steep gradient on the N.W. side of the hurricane, and the destructive N.E. winds. In the South the inland winds were light and variable.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from S.byE. over a S.Ely. gale in about 45° N. and 40° W.; cir. from S.S.W. over a S.S.E. wind to the Wd. of the Azores; cir. from N.W. over a W.byN. wind to the Nd. of Madeira; and cir.-c. from E.byN. over a S.Ely wind to the Sd. of Bermuda.

In EUROPE, Dovre had a calm, with light Wly. to Sly. winds near; Chaumont had a very light S.Wly., St. Gotthard a fresh Sly. breeze with clouds from S.E., and Julier a light S.Ely. wind with clouds from E.; the lower winds in the neighbourhood were chiefly light N.Ely., Ely., or S.Ely.

Over AMERICA the upper clouds were chiefly from N.E. or N.W. Mount Mitchell had a fresh N.E. breeze, and Mount Washington a fresh N.W. gale.

The ISOTHERMS are very similar to those of previous days. The Nly. wind to the Ed. of the ridge of high pressure in about 30° W. dips those of 70° and 60° to the Sd. of their usual track.

A temperature of 83° is shown on the W. Coast of Africa and one of 87° at Key West, N. of Cuba, whilst 85° is shown to the Ed. of Florida. At Cape Coast Castle in the Gulf of Guinea there was a reading of 78°.

AUGUST 24, 1873.

This day had the HIGHEST PRESSURE (30·40) in the Lake District of North America; and it only amounted to 30·26 in the centre of the Atlantic. The ridge of high pressure alluded to on the 23rd had travelled to the Ed., and was to the Nd. of the Azores; it had an area of low pressure on each side of it, of which the Nly. and Sly. winds were in close contact; as also were the S.Ely. winds of the hurricane, and the

N.Wly. winds of the area of low pressure which was to the Ed. of Newfoundland. In the neighbourhood of the British Isles and Bay of Biscay there was a cyclonic movement of the wind in which N.Ely winds were to the N.Ed. of S.Ely. winds, so that the motion of the air seems to have described a kind of scroll, as indeed it did in the hurricane.

The area of high pressure over the Atlantic was still well to the Sd., and the N.E. TRADE seems to have commenced in about 31° N. Observations were wanting in the neighbourhood of the Cape Verds, but the S.W. monsoon was shown in about 10° N. In the same latitude, but further to the Wd., there was a gentle Ely. breeze, whilst with No. 287, near the West Indian Islands, there was a fresh E.S.E. breeze, with overcast and rainy weather.

At SOMBRERO (WEST INDIES) the barometer had fallen a tenth, the wind had veered to East, but the weather was fine.

No. 189 (South of Bermuda) was still steaming to the Nd., her barometer had fallen slightly, and the wind had veered to S.W. with fine weather, but she was still experiencing a N.W. swell caused by the hurricane. At times the captain calls the sea "turbulent." The following are extracts from her log :—

	Barometer.	Wind.	Remarks.
25th, 0.20 a.m.	30·02	S.W.byW. 5.	N.W. swell.
„ 8.20 „	30·00	N.W.byW. 4.	„ cloudy, with rain.
„ 10.20 „	-	- -	Arrived at Bermuda.

NOTE.—She was evidently steaming up towards the hurricane and feeling the outskirts of its wind and sea.

The register of the lighthouse keeper at BERMUDA gives the following data :—

	Barometer.	Wind.	
24th, 4.20 p.m.	29·914	W. 9.	Cloudy and hazy. This is the lowest barometer reading recorded at Bermuda.
„ 8.20 „	30·011	„ „	„
25th, 2.20 a.m.	29·982	„ 6.	Cloudy. Passing squalls, rain North.
„ 6.20 „	29·989	„ 4.	„
„ 10.20 „	29·989	N.W. 4.	Cloudy and hazy.

NOTE.—It seems probable that the barometer reading at 8.20 p.m., 24th, is in error, as it was hardly likely to rise a tenth during the strength of the gale and then fall again at 2.20 a.m., 25th, although no doubt the diurnal range had some effect. This opinion is confirmed by the fact that there was no such rise recorded by No. 267, a ship to the Nd. of Bermuda; her log is quoted below.

Nos. 234 and 267 were N. from Bermuda and standing to the S.Wd. The following are extracts from the log of No. 267 :—

	Barometer.	Wind.	Remarks.
24th, 4.20 p.m.	29·91	W.byS. 8.	Weather fine, but misty.
„ 8.20 „	29·90	„ 5.	„ squally.
„ 11.20 „	- -	N.W.byW. 3.	„ fine.
25th, 0.20 a.m.	29·90	„	„ „
„ 4.20 „	29·86	N.W.byN. 3 to 4.	„ fine, but misty.
„ 8.20 „	29·91	N.W.byW. 3 to 4.	„ fine.

No. 234 recorded the barometer hourly between 4.20 and 8.20 p.m., 24th, the whole of which time it remained steady at 29·90. It was then recorded less frequently, and was as follows:—

	Barometer.	Remarks.
24th, 10.20 p.m.	29·92	
25th, 0.20 a.m.	29·97	
„ 4.20 „	29·97	
„ 8.20 „	29·98.	Her wind was given as W.N.Wly. 3 to 4, and 2 to 3, between 7.20 p.m., 24th, and 4.20 a.m., 25th.

The direction and force of wind with No. 127, lying N.W. from Bermuda, are based on very poor data, the remarks being:—

23rd (no hour given).	Heavy gale from S.E. to S.
24th „	Gale continued with great force, wind hauling to N.W.

No. 129, hove-to on the En. side of the hurricane, gives the following remarks in a mere abstract of her log, the barometer observations are very doubtful:—

24th, 10 a.m. to 1 p.m.	Barometer fell rapidly to ? 29·10.
„ 1 p.m. to 4 p.m.	Steady blowing hurricane from South.
„ 4 p.m.	Barometer rose to ? 29·40, wind shifted to W. and moderated to a gale with hard squalls; it was almost dark at noon with rain and spoondrift. The captain closes his abstract by saying, "I had only the strength of the hurricane from 9 a.m. to "Noon 24th (1 p.m. to 4 p.m. Greenwich time), when the wind shifted to West, and "moderated to a gale during the evening. It blew strongly from West for the two "following days."

No. 171 (also hove-to on the En. side of the hurricane) gives the following remarks:—

24th, 4 p.m.	Strong hurricane (S.S.Ely.) and rain; tremendous sea running.
„ 7 „	A very heavy sea struck the starboard bow, and carried away jib-boom, &c.
„ 11 „	Set lower fore topsail.
25th, 4 a.m.	More moderate, with squalls (? S.Wly.)
„ 11.30 a.m.	Set foresail and kept ship before the wind. (NOTE.—Wind apparently S.Wly.)

No. 101, on the N.En. side of the hurricane and to the Nd. of No. 171, was a steamer bound to the N.Ed.; she gives the following data:—

	Barometer.	Wind.	Remarks.
24th, 2.20 p.m.	- -	-	Increasing breeze and sea.
„ 4 „	? 29·42	S.E.byS.	Strong breeze, and cloudy, with rising sea. Position 41° 26′ N., 58° 20′ W. From this time till 2 a.m., 25th, the ship only made 1 to 2 knots an hour to the S.Ed. or S.Wd., apparently steaming nearly head to wind.
„ 5 „	- -	S.E.byS.	Fresh gale and rising sea; securing everything.
„ 6 „	? 29·05	„	
„ 7 „	- -	S.E.	
„ 8 „	? 28·90	„	Strong gale and high sea.
„ 9 „	- -	S.	
„ 10 „	? 28·35	„	
„ 11 „	- -	S.W.	
„ Midt.	? 29·00	„	Violent gale and tremendously high head sea; ship's head S.W.by S.
25th, 2 a.m.	? 29·10	„	Gale moderating; ran before the wind steering N.E.
„ 4 „	? 29·15	„	Similar weather.

No. 57, to the Nd. of No. 101, was steaming about 12 knots an hour to the Wd.; she had just got the first of the S.Ely. wind of the hurricane, with heavy rain; an hour previous the wind had been light and variable with heavy rain. The following are extracts from her log:—

		Barometer.	Wind.	Remarks.
24th,	4 p.m.	29·25	E.S.Ely.	Brisk breeze, heavy rain, smooth sea.
,,	8 ,,	28·97	S.S.E. to N.W.	Wind suddenly shifted to N.W. during heavy rain. Ship's speed reduced to about 3 knots to the Wd.
,,	8.15 ,,	- - - - -		Constant heavy rain with thick weather, wind increasing into a heavy gale with heavy head sea.
,,	Midt.	28·68	- - -	Strong gale and high head (W.S.W.) sea.
25th,	1 a.m.	- -	W.S.W.	
,,	2 ,,	- -	S.S.W.	
,,	3 ,,	- -	North	
,,	4 ,,	28·46	N.N.E. to W.S.W.	Strong gale and high head (W.N.W.) sea; wind variable from W.S.W. to N.N.E., with constant rain.
,,	5 ,,	- -	N.N.E. and variable to W.S.W.	At 5 a.m. wind increased to a perfect hurricane, with constant heavy rain.
,,	7 ,,	- -	West	
,,	8 ,,	28·14	W.N.W.	Less wind and rain, very high sea.
,,	10 ,,	- - -	- -	More moderate, and sea going down.
,,	Noon	29·04	N.W. by N.	Moderate gale and high W.N.W. sea.

NOTE.—No. 57 seems to have had the wind variable between N.N.E. and W.S.W. for three hours before the strength of the hurricane came on, which seems to have been from W. The log seems to have been very carefully kept throughout the gale. She steamed slowly to the Wd. throughout. The sudden shift of wind from S.S.E. to N.W. at 8 p.m., 24th, and its then backing to S.S.W., followed by a veering to N., and then by a variable wind from W.S.W. to N.N.E., the wind having the force of a strong gale the whole time, and ending with a hurricane from W., make it probable that various eddies passed over the ship before the area of lowest pressure passed to the Nd. of her, causing a hurricane from W. which veered to N.W. as the wind lulled.

No. 65, to the Ed. of No. 57, was another powerful steamer, steaming 13 knots an hour to the Wd.; her wind had just backed from W. through S.W. to S.E., and her barometer had commenced falling. A reference to the chart of the 24th will show that she had passed from the Wly. wind and high barometer of a ridge of high pressure (which lay between an area of low pressure further to the N.Ed. and the hurricane) to the S.Ely. wind on the outskirts of the hurricane. The following are extracts from her log:—

		Barometer.	Wind.	Remarks.
24th,	2 p.m.	- - - -		Squally, unsteady wind (apparently S.Ely.); took in fore topsail.
,,	4 ,,	29·56	S.E.	Steady wind, set fore topsail and foresail.
,,	5 ,,	- -	E.S.E.	
,,	6 ,,	- -	,,	Wind increasing, barometer falling rapidly in foresail and gaff topsail.
,,	7 ,,	- -	,,	Took in fore and aft sails, close-reefed fore topsail.
,,	8 ,,	28·67	,,	Strong gale, wind backing to the Ed.
,,	9 ,,	- -	E.N.E.	Wind fell light, in fore topsail.

	Barometer.	Wind.	Remarks.
24th, 9.30 p.m.	-	S.S.W.	Sudden shift of wind to S.S.W., blowing very heavily.
„ 10 „	28·12	„	Ship's speed reduced from 13 to 3 knots an hour by change of wind. Ship's head about W.¼S.
„ 11 „	-	S.S.W.	
„ Midt.	28·94	„	Heavy gale, and high confused sea.
25th, 2 a.m.	-	S.W.	
„ 4 „	29·02	„	Strong gale, with rain.
„ 5 „	-	„	
„ 6 „	-	„	Wind increasing, and confused sea.
„ 7 „	-	-	Very heavy gale, and high confused sea.
„ 8 „	29·03	W.S.W.	More moderate, sea running more fair.
„ Noon.	29·07	„	Strong gale, high Westerly sea.

NOTE.—It will be seen that No. 65 had her lowest barometer about 10 p.m., 24th,* after a sudden shift of wind from E.N.E. to S.S.W., when it blew very hard.

No. 57 (see the previous page), about three degrees to the Wd. of No. 65, had a sudden shift from S.S.E. to N.W. at 8 p.m., 24th, but she did not have her lowest barometer until about 8 a.m., 25th, the wind having backed to W.S.W. at 1 a.m., 25th, to S.S.W. at 2 a.m., and being N. at 3 a.m., 25th, after which time it was variable between N.N.E. and W.S.W., and at 5 a.m. had increased to a perfect hurricane. It will be seen that No. 65 had an increasing wind at 6 a.m., 25th, and a decided check in the rise of the barometer shown at 8 a.m. So that these ships seem to have been nearly simultaneously affected by two oscillations of barometer and wind, the first causing the lowest barometer to the more En. ship and the second to the more Wn. No. 101, steaming to the Ed. and meeting No. 65, got the lowest pressure at the same hour (10 p.m., 24th) and had much the same wind. She does not seem to have felt the oscillation of pressure at 8 a.m., 25th, but by that time she was several degrees to the Ed. of No. 65.

The sudden shift of wind from E.N.E. to S.S.W. experienced by No. 65 at 9.30 p.m., 24th, when she was steaming fast to the Wd. and the hurricane was moving to the N.Ed., is a remarkable proof that the circular theory is not literally correct, for with an E.N.E. wind the centre of the hurricane (according to that theory) would bear S.S.E. and the wind ought to have changed to N.E. and N. A glance at the Nn. part of Diagram 2, see p. 88, shows, however, that such a change might take place in a whirl resembling that of the Diagram. The remarks which follow show that No. 159 had a similar change to that of No. 65.

No. 159 (to the Nd. of No. 65) was steaming about 10 knots an hour to the W.S.Wd. for New York. She had passed through the Wly. wind and fine weather which lay to the Ed. of her, and the wind had gradually backed from W. to S.E.byS., the weather had become thick with rain, and the atmosphere close and muggy.

* Of course the lowest pressure may have taken place at some time between the various readings recorded in the logs so that the entries are only approximately the lowest.

The following are extracts from her log:—

			Barometer.	Wind.	Remarks.
24th,	4	p.m.	29·67	E. by S.	Fresh breeze.
„	8	„	28·87	„	Strong wind, in all sail but foot of fore and main trysail and jib.
„	9	„	28·37	„	Blowing a hard gale.
„	9.30	„	- -	- -	Split main trysail, took in all sail.
„	10	„	- -	N.E. by E.	Ran into a calm.
„	10.45	„	- -	S. by W.	Wind came from S.byW. with the violence of a hurricane; ship hove-to with tarpauling in mizen rigging, head West, speed reduced to 1 knot.
25th,	1	a.m.	- -	- -	Head S.E.byS., speed 1 knot.
„	3	„	28·68	S.W.	Head S.byW., speed 1 knot.
„	4	„	- -	- -	Wind moderating, sky became clear at times, tremendous sea on.
„	5	„	- -	S.W.	Blowing a gale; head S.E.byS., speed 1 knot.
„	6	„	28·50	E. by N.	Barometer fell three-tenths, wind suddenly shifting to E.byN. and blowing with hurricane force; kept the ship's head to the Ed. Tremendous cross sea.
„	8	„	- -	E. by S.	Head S.E.byS.
„	9	„	- -	S.E. by S.	Wind shifted to S.E.byS. and moderating in violence; sea like mountains; engineers cutting off steam by throttle valve during the violent pitching.
„	Noon		- -	S. by E.	Head S.byE.

At 1 p.m., 25th, the barometer was 28·54; from which time the wind gradually veered to the S.Wd. with a slowly rising barometer, as will be seen in the remarks on the 25th.

NOTE.—By referring to the extracts of No. 65 (p. 57), it will be seen that she got a change of wind from E.S.E. to E.N.E. at 9 p.m., 24th, when the wind fell light; at 9.30 p.m. she got a sudden shift to S.S.W. and blowing very heavily. The above extracts from log No. 159 show that these changes took place with her at about 10 and 10.45 p.m., or an hour later than with No. 65; the wind directions recorded by the two vessels agree to a point, but No. 159 had a calm instead of the light wind.

The remarks of No. 57 (p. 57) show that at 8 p.m., or about two hours previous to the time of No. 159's change, she had a sudden shift of wind from S.S.E. to N.W., when the force increased to a heavy gale; the N.W. wind was very shortly afterwards backing to S.W., so that within two hours the three ships were affected by sudden and remarkable changes.

Again at 6 a.m., 25th. when No. 65 had a S.Wly. wind increasing to a very heavy gale, and most probably a fall of the barometer (for the barometer at 8 a.m. was about the same as at 4 a.m.), No. 159 had a fall of three-tenths in the barometer and a sudden shift of wind from S.W. to E.byN., the force increasing from that of a mere gale to a hurricane. Two hours previous, or at 4 a.m., 25th, No. 57 had a strong gale which was variable from W.S.W. to N.N.E. with constant rain. At 5 a.m. the wind was N.N.E. and variable to S.S.W., when it increased to a perfect hurricane with constant heavy rain. Her barometer was *apparently* falling throughout, though there

was an evident check in the amount of fall between midnight and 4 a.m. By 7 a.m. her wind was W. and at 8 a.m. W.N.W. decreasing in force, when the barometer was most probably rising.

The following are the approximate positions of the above ships at 6 a.m., 25th. No. 57, 42° 45′ N., 62° 15′ W.; No. 65, 42° 2′ N., 58° 52′ W.; No. 159, 43° 16′ N., 58° 2′ W.

These facts show some complicated changes within the hurricane, which have been very carefully recorded by steamers; they, not being so dependent on sail and less heavily rigged than sailing ships, have more time to look after the wind in such extreme cases.

No. 10, to the N.Wd. of No. 159, was steaming to the E.N.Ed. about 7 to 8 knots an hour. The following are extracts from her log:—

	Barometer.	Wind.		Remarks.
24th, 3 p.m.	? 29·80	E.S.E.	7.	
„ 11 „	? 29·40	„	9.	
25th, 6 a.m.	? 29·50	„	7.	The wind direction remained steady until 10 p.m., 25th, when it was S.S.E., but it moderated in force.

No. 144, to the N.Ed. of No. 10, was steaming to the Ed. about 4 knots an hour. The following are extracts from her log:—

	Wind.		Remarks.
24th, 10 p.m.	E. by N.	6.	
25th, 4 a.m.	„	9.	In five hours time the wind veered to S.E., and a few hours later began to decrease in force.

No. 98, in about 42° N. and 65° W., was steaming 7 to 8 knots an hour to the Wd.; her barometer fell slowly until about 4 p.m., 24th, when it was 29·57; from this time until 8 p.m. she had a heavy N.W. gale, the barometer at 8 p.m. being the same as at 4 p.m.; after this hour the barometer rose and the wind lulled, but continued N.W.

No. 228 was at moorings in Halifax, Nova Scotia. The following are extracts from her log:—

	Barometer.	Wind.		Remarks.
24th, 6 p.m.	29·34	N.N.W.	4.	Overcast, with rain.
„ 8 „	29·19	„	5 to 6.	„
„ 10 „	29·03	„	5 to 7.	„ and squalls.
„ Midt.	29·05	North	4 to 7.	„ „
25th, 1 a.m.	29·08			
„ 4 „	29·03	N.N.W.	5 to 8.	Overcast and squalls.
„ 5 „	28·97	„	8 to 10.	Overcast and squally. (The lowest pressure and strongest wind recorded.)
„ 6 „	29·03			
„ Noon	29·36	North	4 to 6.	Squally, with detached clouds.

NOTE.—It will be noticed that No. 228 had an increase of pressure between 10 p.m., 24th, and 1 a.m., 25th, and that her lowest pressure at 5 a.m., 25th, was at about the same time as the fall of three-tenths with No. 159 and when she as well as Nos. 57 and 65 had an increase of wind, in two cases to hurricane force.

No. 105 was in Cow Bay, Nova Scotia, and gave N.E.byE. as the wind for the whole 24 hours, hence it is quite possible that her wind agreed more nearly with the S.Ely. wind of No. 149 at the time of the Chart; still it will be seen that No. 149 had the wind East three hours after the time of the Chart, and N. by E. in another two hours.

No. 31 was in Pictou Harbour, Nova Scotia, and probably did not record every change of wind: two hours after the time of the Chart she recorded it as N.N.E.

No. 149, to the Nd. of No. 31, was at sea; her S.Ely. wind appears remarkable, but this was a case in which the wind was quickly backing from S.S.W. to N.byE. This ship had experienced a fresh S.S.Wly. breeze and fine weather since 9 a.m. of the 23rd, and was sailing to the Wd. at the rate of about 6 knots an hour.

The following are extracts from her log. With the object of showing the backing of the wind the extracts begin nine hours before the time of the Chart, instead of after that time, which is our usual custom.

	Wind.	Remarks.
24th, 4 a.m.	S.S.W. 4.	Gloomy weather.
„ 6 „	- -	Heavy rain with light wind.
„ 8 „	- -	„ looking bad; took in all light sails.
„ 10 „	S.S.E.	
„ Noon.	- -	Looking very bad; took in top-gallant sails; wind increasing. (This was near the time of the Chart.)
„ 2 p.m.	E.S.E.	
„ 4 „	East.	Blowing a heavy gale; speed reduced to 3 knots.
„ 6 „	N.b.E.	Heavy gale; head W.N.W.
„ 8 „	- -	Gale increasing in violence.
„ Midt.	- -	Gale still increasing: stowed reefed foresail.
25th, 4 a.m.	- -	Fore-topmast staysail blew away. Head West.
„ 8 a.m.	- -	Gale still continuing to blow with great violence.

So that three hours later than the time of the Chart, the wind was East, and in another two hours N.byE.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was generally steady, but it had risen a little at Nassau, where there was still a swell on the bar; the wind was Ely. and weather fine.*

On the COAST OF AMERICA the barometer had risen between 30° and 40° N., but to the Nd. of 40° N. it had fallen, under the influence of the hurricane, though probably not so much as it would have done if there had not been an area of high pressure approaching from the Wd. The winds were light Wly. and calm to the Sd. of 35° N., but further to the Nd. they were strong from N.E. to N.W. under the combined influence of the hurricane and the area of highest pressure already alluded to. The Coast of America was warned on this day. See the remark on the 23rd.

* Owing to a clerical error in the log, which was discovered after the chart went to press, No. 77 (to the Ed. of Florida) has been placed 3° too far south on this day's chart. The isobars and isotherms are of course slightly affected by this mistake. See Appendix A. for the true position of No. 77.

The INLAND WINDS OF AMERICA were very much influenced by the area of highest pressure in the Lake District.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA (see the lower left-hand corner of the Chart) show that cir. were moving from N.W. over a N.N.W. wind near New York. There were also cir. from the S.Wd. over a S.Wly. wind at 6 p.m., with No. 181, in about 46° N. and 39° W.

In EUROPE, Dovre had a calm with a strong S.W. breeze near; Chaumont had a calm, St. Gotthard a fresh South breeze, and Julier a very light S.Wly. wind with clouds from N., whilst the lower winds at the nearest stations were chiefly light Sly. At Brussels there were clouds from the S.Ed. over a light Ely. wind.

Over AMERICA the upper clouds were from various directions. Mount Mitchell had a fresh N.Wly. breeze, and Mount Washington almost a hurricane from the same quarter, apparently under the influence of the hurricane which lay to the Ed. of them.

The ISOTHERMS of 80°, 70°, and 60° are near to each other on the Wn. side of the Atlantic, those of 70° and 60° are driven to the Sd. by the Nly. wind on the Wn. side of the hurricane, and to the Nd. by the Sly. wind on its En. side. Elsewhere they resemble those of previous days.

A temperature of 85° is shown on the W. Coast of Africa, and one of 86° to the Ed. of Florida,* whilst 76° prevailed in the Gulf of Guinea.

AUGUST 25, 1873.

This day had the HIGHEST PRESSURE (30·31) to the S.Wd. of the Azores, but it amounted to 30·24 in Davis Straits and Labrador, whilst 30·20 was shown in Sweden, so that whilst the hurricane and two other areas of low pressure existed between 40° and 55° N., the pressure ranged higher than usual to the Nd. of 55° N. The central area of highest pressure was in about 32° N., and the winds to the Nd. of it were chiefly governed by the hurricane and the areas of high and low pressure already alluded to.

The N.E. TRADE was light and variable with all ships to the Nd. of 24° N. The N.E. Trade and S.W. monsoon seem to have met in about 10° N. In about 12° N. and 49° W. there was a fresh N.E. breeze and cloudy weather.

At SOMBRERO (WEST INDIES) the barometer had risen very slightly, the wind had veered to E.S.E., force 3, and the weather was cloudy.

In the neighbourhood of BERMUDA the barometer had risen, the wind was moderate N.Wly., and the weather fine, the hurricane having passed and bearing at the time of the Chart N.N.E. from the island.

There were still many vessels involved in the hurricane, those on its Sn. side had experienced their worst weather, and quotations from their logs will be found in the remarks of the 24th.

* As already remarked, owing to a clerical error in the ship's log, this last temperature is placed 3° to the Sd. of its real position, and the reader is requested to correct the Chart.

No. 159 (on its S.En. side) was a steamer bound to the westward; she gives the following remarks:—

	Barometer.	Wind.	Remarks.
25th, 4 p.m.	? 28·58	S. by W.	NOTE.—A lower pressure had been experienced on the 24th, see that day's remarks.
„ 5 „	- -	„	Terrific squalls of wind and rain. The ship was steaming 1 knot head to wind and almost under water, rolling and plunging violently.
„ 8 „	? 28·63	S.W. by W.	At 10 p.m. squalls not so severe.
„ Midt.	? 28·70	W. by S.	Wind moderating, set fore trysail. Ship making 3 knots on a S.W. by W. course.
26th, 4 a.m.	? 28·80	W. by N.	Speed 5 knots to S.Wd.
„ 5 „	- -	N.W.	Blowing a gale, with thick weather.
„ 8 „	? 29·00	W.N.W.	A moderate gale; weather finer. Speed 6 knots to S.Wd.

No. 5 (to the Nd. of No. 159) was steaming to the S.Wd. for New York at the rate of 12 or 13 miles an hour. By referring to the Chart of the 24th it will be seen that she was then in a calm on the ridge of high pressure which lay between the area of low pressure to N.Ed. and the hurricane to the S.Wd. of her.

Her case is so interesting that we will commence the quotation from her log at 4 p.m., 24th, so as to show the changes for two days in a connected form.

	Barometer.	Wind.	Remarks.
24th, 4 p.m.	30·01	N.Ely.	Light airs, and fine, clear, pleasant weather. Ship steaming 12 knots to the W.S.Wd.
„ 8 „	30·03	E. by S.	Freshening breeze, set all possible sail.
„ 8.40 „	- - - -	-	Cape Race lighthouse abeam.
„ 10 „	- - - -	-	Cape Pine lighthouse abeam.
„ Midt.	29·83	East.	Strong breeze and overcast.
25th, 4 a.m.	29·53	„	2. „ heavy rain and high sea.
„ 8 „	29·23	E.S.E.	3. Light breeze, clear and fine, very heavy beam sea.
„ Noon.	29·03	„	9. Strong gale and cloudy, with heavy rain. This was near the time of the Chart for the 25th.
„ 4 p.m.	28·73	N.E.	10. Brought ship to the wind and furled square sails.
„ 5 „	- - - -	-	Head S. by W., speed 5½ knots, but soon increased to 7.
„ 6 „	- -	S.	?
„ 8 „	28·94	S.	?
„ 9 „	- -	S.W.	?
„ 11 „	- -	W.S.W.	Gale moderating, thick overcast weather, and high cross sea.
„ Midt.	29·26	„	Changed course to S.E. by S., speed increased to 10 knots.
26th, 4 a.m.	29·48	„	Strong breeze and overcast, with high cross sea. Changed course to S. by W., speed decreased to 7 knots.

From this time she had a gradually decreasing W.S.W. wind and fine weather, with a rising barometer.

No. 35 (to the S.Ed. of No. 5) was also steaming to the S.Wd. for New York, but only at the rate of 10½ to 11½ knots an hour. The Chart of the 24th shows her also on the ridge of high pressure which lay between the hurricane and the low pressure to the N.Ed. of her. The following are her observations at the same hours as those of

No. 5, and therefore commencing 21 hours before, instead of after the hour of the Chart, the latter being our usual custom :—

		Barometer.	Wind.	Remarks.
24th,	4 p.m.	29·95	W.S.W.	Light variable wind, with fine clear weather.
„	8 „	29·91	S.E.byS.	Moderate breeze and fine, sea smooth.
„	Midt.	29·80	S.E.byE.	Increasing breeze, and hazy. At 1.30 a.m., 25th, squally, with heavy rain.
25th,	4 a.m.	29·68	E.S.E.	Strong breeze, with constant heavy rain and frequent flashes of lightning to the W.N.Wd.
„	8 „	29·51	S.S.E. to S.E.	7. Moderate gale with very squally weather and lightning in the E.S.E. and W.N.W. quarters. A heavy cross sea.
„	Noon.	29·35	S.S.E.	8. Fresh gale with constant rain. This was near the time of the Chart.
„	4 p.m.	29·30	South	9. Strong gale with very heavy sea. Head W.S.W., speed reduced to about 6 knots.
„	8 „	29·29	S.byW.	
„	10 „	29·31	-	- Strong gale, furious squalls, sea very cross and heavy.
„	Midt.	29·35	-	- Strong gale.
26th,	4 a.m.	29·41	S.W.byS.	More moderate, sky clear at intervals.
„	8 „	29·45	S.W.	Moderate gale, with passing showers and heavy cross sea.

No. 103 (to the N.Ed. of No. 5) was a sailing ship running to the W.N.Wd. for Quebec before an E.S.E. gale, her wind had been E.S.E. for 24 hours. The following are extracts from her log; they also commence before the time of the Chart, so as to show how her bad weather came on :—

		Barometer.	Wind.	Remarks.
24th,	Midt.	- -	E.byS.	Strong breeze and hazy. Ship running 9 knots.
25th,	1 a.m.	- -	„	A heavy squall carried away main royal mast.
„	4 „	- -	„	Strong gale and thick, with heavy squalls and rain. Speed reduced to 6 knots.
„	4 p.m.	? 28·98	E.byN. 9	High sea.
26th,	2 a.m.	- -	N.E. 9	
„	8 „	- -	N.E.	Gale decreasing and sea going down.

This ship passed to the Wd. in front of the hurricane, and brought the wind N.E., when the gale decreased in force and drew more Nly.

No. 168 (to the Ed. of No. 103) was also a sailing ship bound to Quebec. The following extracts show that although the ships were so near each other the hurricane centre passed between them :—

		Wind.	Remarks.
24th,	Midt.	N.E.byE.	Increasing breeze, in all light sails. The ship was running 10 knots an hour.
25th,	4 a.m.	„	In top-gallant sails, main sail, and reefed topsails.
„	8 „	„	Same weather, heavy S. sea
„	11 „	E.byS.	
„	3 p.m.	S.E.	Heavy gale, and very heavy S. sea; reefed foresail; head S.W., going 7 knots.
„	Midt.	„	Increasing gale, speed reduced to 3 knots.
26th,	1 a.m.	S.byE.	
„	4 „	„	Gale increasing, with a fearfully heavy sea; furled upper topsails.
„	8 „	S.S.W.	
„	Noon.	„	Gale "taking off." Set upper topsails.

No. 10 (to the Nd. of 168) was steaming 7 to 8 knots on a N.E.byE. course; she kept a fresh S.Ely. wind, which drew more Sly. with a rising barometer. These facts indicate that she was increasing her distance from the hurricane, and that on its way to the Nd. it passed well to the Wd. of her.

No. 40 (to the Ed. of No. 10) was another sailing ship bound to Quebec; she had the wind gradually veering to the Sd. and S.Wd., until 10 p.m., 25th she made about 6 knots to the S.Wd.; from 11 p.m., 25th, to 8 a.m., 26th, she had a strong gale from S.E., and was hove-to on the starboard tack; then, as the wind veered to the Wd. of South, it abated. At 2 p.m., 26th, she wore ship and stood to the Wd. on the port tack.

Two ships moored at St. John's, Newfoundland, had the lowest barometer, the one at midnight, 25th, the other at 4 a.m., 26th, when the wind was light, but veered from N.E. to E., and eventually to S.E. and S. Their strongest wind (3 to 6 in squalls) occurred between 6 and 10 a.m., 25th, when the direction was E.N.E. to E.S.E.

We will now refer to the logs of a few ships that were on the Wn. side of the hurricane.

No. 57 had experienced her lowest pressure (28·14) and strongest wind about 6 to 7 a.m. 25th (see the remarks of the 24th), and her wind was gradually veering to the N.Wd. with a rising barometer as she steamed to the Wd.

No. 228 (in Halifax) had experienced her lowest pressure (28·97) and strongest wind at about 5 a.m. to 7 a.m., 25th, see the remarks of the 24th for further particulars. The direction of her strongest wind was N.N.W., and although it was N. at the time of the Chart, it was chiefly N. by W. to N.N.W. throughout the 25th.

NOTE.—These remarks show that St. John's, Newfoundland, had the strongest wind an hour or two later than Halifax, but it had its lowest barometer about twenty hours later.

No. 105 (in Cow Bay, Nova Scotia) gives only one wind direction for the 24 hours; the log says, "a.m., blowing a hurricane; morning, moderating a little," so it is probable that, considering the difference of time, the hurricane was moderating about the time of the Chart.

No. 164 (in Sydney Harbour, Cape Breton) had a hard N.byE. gale and heavy squalls; she gives the following entries:—

	Barometer.	Wind.	Remarks.
25th, 4 p.m.	29·10	N. by W.	Hard gale, with very heavy squalls, and thick, heavy rain.
„ 8 „	29·06	„	„ „ „ „ „ „
26th, 4 a.m.	29·10	?	Gale abating.
„ ? „	?	W. by N.	Commences with fresh breeze and gloomy weather.

With No. 31 (in Pictou Harbour, Nova Scotia) the N.N.E. gale had just moderated at the time of the Chart.

No. 172 was in sight of Cape Ray lighthouse at the time of the Chart, and steaming to the N.Wd. at the rate of about 10 knots an hour. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
25th, 5 p.m.	29·37	N.E.byE.	Very heavy gale. At 4.30 p.m. brought ship to the wind and sea with all sails stowed. From this time she was heading to the N.Ed. and making about 3 knots.
26th, 1 a.m.	29·32	N.E.	Very heavy gale; sea running very high and breaking badly.
„ 5 „	29·36	„	„ „ „ „

The wind and weather continued the same with a slowly rising barometer until 6.30 p.m., 26th, when the wind moderated and the sea was going down. She kept away to the Wd. at 10 p.m., 26th, when the wind was N.byW. and gradually became more Wly.

No. 69, N.W. from No. 172, was a steamer bound to Liverpool. The following are extracts from her log. She was steering to the Ed. and making about 3 knots an hour.

	Barometer.	Wind.	Remarks.
25th, 4 p.m.	29·98	N.E. 10.	Hard gale, and gloomy, threatening weather. Head E.byN.
„ 8 „	30·02	„ 9 to 10.	„ „ „ „ N.
„ Midt.	29·89	„ „	Very heavy sea. „ E.N.E.
26th, 4 a.m.	29·84	„ „	„ „
„ 8 „	29·92	„ 10.	„ „

NOTE.—She makes no mention of the gale's moderating until Midnight, 26th.

No. 39, close to No 69, was also a steamer bound to the Ed.; she experienced very similar weather to that of No. 69, and it continued until 8 p.m., 26th, when it was moderating.

No 149, S.W. from No. 39, was a sailing ship hove-to on the starboard tack until 2 a.m., 26th, then on the port tack until 8 a.m., 27th. At 4 a.m., 27th, the wind was N.W.byN. "gale taking off." This is the first mention of a decrease of wind, in this log.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had fallen, the wind was Ely. to N.Ely., and the weather fine. At Nassau there was still a heavy swell on the bar, which seems to be accounted for by the fact that the N.Ely. wind of the hurricane had been driving a sea in that direction for several days.

On the COAST OF AMERICA the barometer had fallen, the fall increasing as the neighbourhood of the hurricane was approached. The wind was light N.W. to calm South of 35° N., to the Nd. of that parallel it was governed by the hurricane.

The INLAND WINDS OF AMERICA were from various quarters.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from W.byS. over a W.byS. wind in about 46° N. and 36° W.; and cir. from S.S.W. over a N.Wly. wind to the N.Wd. of the Azores.

In EUROPE, Dovre had a calm with light Nly. winds near; Brussels had clouds from the S.Ed. over a S.Wly. wind; Chaumont a light S.E., St. Gotthard a fresh South, and Julier a very light S.Wly. breeze; Julier had clouds from S., the lower winds in the neighbourhood were light S.Ely.

Over AMERICA the upper clouds were chiefly from N.W. to W., whilst Mount Mitchell had a fresh N.W., and Mount Washington a strong N. breeze, both being probably influenced by the hurricane.

The ISOTHERMS are affected by the hurricane similarly to those of the 24th.

A temperature of 84° is shown on the W. Coast of Africa, and one of 87° to the Ed. of Florida, whilst it was as low as 75° in the Gulf of Guinea.

AUGUST 26, 1873.

This day had the HIGHEST PRESSURE (30·41) to the S.Wd. of the Azores, whilst it amounted to 30·27 in Sweden, and was still remarkably high in Davis Straits. There are still indications of two other depressions between 45° and 55° N. besides the hurricane. The Sly. winds on the En. side of the hurricane, and the N.Wly. winds of the depression which lies further to the Ed., were very near each other. Between 45° and 50° N. they seem, as it were, gradually to have veered into each other.

The N.E. TRADE was still light and variable; it was drawn into a fresh N.Wly. wind near the Cape Verds, and had the S.Wly. monsoon a few miles to the Sd. of it. Further to the Wd. the Trade became Ely., and eventually S.Ely. near the WEST INDIA ISLANDS, where the barometer was steady and the weather fine.

At BERMUDA the barometer had risen slightly, the wind had backed to the Wd. and the weather was fine; there was, however, a heavy Nly. swell to the Nd. of the islands, which was no doubt caused by the hurricane.

At the time of this day's Chart the HURRICANE had its centre off the South Coast of Newfoundland; it will, however, be well to keep to the practice of quoting various data respecting it, before going on with remarks on the Bahamas and Coast of America.

No. 55 (in about 41° N. and 56° W.) was to the Sd. of the hurricane, and steaming 14 knots an hour on a W.byN. course; her barometer gradually rose, and she kept a moderate Wly. breeze with fine weather.

No. 35 (to the N.Wd. of No. 55) was steaming about 7 knots an hour to the W.S.Wd.; her barometer gradually rose, the wind veered to the Nd. of West, and she gradually increased her speed up to 10 knots.

No. 168 (to the Nd. of No. 35) had the wind gradually veering to the Wd., and decreasing in force, as she stood to the N.Wd. on the port tack under easy sail. She had a fearfully heavy W.S.Wly. sea.

No. 40 (to the Ed. of No. 168, bound to Quebec) had experienced her strongest wind from the S.Ed. between 11 p.m., 25th, and 8 a.m., 26th, when she was on the starboard tack, head E.N.E. The following are extracts from her log :—

	Barometer.	Wind.	Remarks.
26th, 2 p.m.	-	South.	More moderate, head west, set main top-gallant sail.
„ 4 „	? 29·60	S.W.	Strong gale and heavy squalls.
„ Midt.	-	-	Cape Pine N.W. 10 miles; wore ship, head S.S.E.
27th, 2 a.m.	-	S.W.	Increasing gale, stowed the jib.
„ 4 „	-	„	Strong gale with showers.
„ 8 and Noon	-	„	Still blowing very hard.

NOTE.—Four hours later the wind was recorded as more moderate. This ship seems to have got better weather by going on the starboard tack, and to have closed with the

gale after standing to the Wd. again at 2 p.m., 26th. The sail she carried seems to indicate that she never had more than force 8.

Two ships moored at St. John's, Newfoundland, had a light S.Wly. wind and squally weather. Their barometers rose slowly; the wind freshened to a force of 5 at times, and eventually veered more to the Wd.

No. 10 (to the Ed. of St. John's) was steaming to the N.Ed. about 9 knots an hour; her barometer gradually rose; the wind continued from S.byE. to S.S.E. varying from a light to a moderate breeze; the weather was clear after 3 p.m., 26th.

No. 103 (on the Wn. side of the hurricane) was bound to Quebec; she had experienced a strong E.byN. gale from 4 p.m. until midnight 25th, when the wind shifted to N.E. At 8 a.m., 26th, the N.E. gale had decreased and shifted to N.byE., as shown in the remarks for the 25th. The following are further extracts from her log:—

	Barometer.	Wind.	Remarks.
26th, 2 p.m.	- -	N.W.byN.	Force not given, but probably about 7, as she had made sail.
„ 4 „	? 29·41.	„	Cape North W.N.W. about 8 miles distant.
„ 8 „	- -	N.byW.	Set main top-gallant sail, head N.E.byE.
27th, 8 a.m.	- -	N.W.	Fresh gale, and thick with rain.

NOTE.—Though the wind had freshened at 8 a.m., 27th, the barometer seems to have been still rising. The ship was beating to windward and making good way, so that the gale was not probably above force 7, if so high.

No. 172 (to the N.Wd. of No. 103, and bound to Montreal) still had a very heavy N.E. gale. The following are further extracts from her log:—

	Barometer.	Wind.	Remarks.
26th, 6 p.m.	29·42	- -	6.30 p.m. Weather moderating, and sea going down.
„ 8 „	-	N. by E.	Ship steaming N.N.E. 3 knots an hour.
„ 10 „	- -	N. by W.	Kept away S.W.
27th, 2 a.m.	29·57	N.W.byN. 6.	Clear weather.
„ 9 „	- -	„	Light breeze and smooth sea. At 8.24 a.m. South Point light of Anticosti bore N.

No. 39 (to the Wd. of No. 172) was steaming to the Ed., but only making 2½ knots an hour. The following are extracts from her log:—

	Wind.	Remarks.
26th, 5 p.m.	N.N.E.	Hard gale with heavy squalls and rain, also a tremendous sea.
„ 8 „	„	Gale moderating, and sea falling a little.
„ 11 „	N.	Still moderating and sea falling.
27th, 5 a.m.	„	Fresh breeze and squally, with showers.

NOTE.—At 0.30 a.m., 27th, Heath Point light was abeam, distant 12 miles, ship steaming N.E.¼E. No. 39 steered for the Straits of Belle Isle; she had a moderate to light Nly. wind and cloudy to pleasant weather for the next 36 hours, until she got to Belle Isle at 6 p.m., 28th, when she had the same wind, but foggy.

No. 69 (very near to No. 39) was also steaming to the Ed. only 2½ knots an hour. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
26th, 8 p.m.	30·00	N.E. 10.	Violent squalls with heavy rain.
„ Midt.	30·02	- - -	Gale inclining to moderate, but still a heavy sea running.
27th, 5 a.m.	- -	N.E.byN. 8 to 7.	Steamed ahead and set course for Cape Ray.
„ 8 „	30·05	N.E.byN.	Fresh gale and high sea; weather gloomy, but improving; ship steaming to the S.Ed. 10 knots an hour.

NOTE.—No. 69 had a decreasing wind which backed to N. when off Cape Ray at 2 p.m., 27th. After this the wind backed to N.N.W., and at 9 p.m., 27th, to N.W., blowing a fresh to moderate breeze with a slightly falling barometer and fine weather. She kept a light to fresh Nly. or N.Wly. wind for several days as she steamed to the N.Ed.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer was steady, the wind N.Ely., and weather fine. No further mention is made of the swell on the bar at Nassau.

On the COAST OF AMERICA the barometer had fallen, chiefly between 35° & 40° N., where the fall amounted to about two-tenths of an inch. The wind was fresh from S. to W. between 30° and 35° N., and from N.W. to N. further to the Nd., where it was still under the influence of the area of low pressure which was related to the hurricane.

The INLAND WINDS OF AMERICA were chiefly Nly. or N.Ely. in the Nn. part, having been under the influence of a high pressure in the W. and low in the E. In the S.W., where the distribution of pressure was reversed, the winds were chiefly S.Wly. or Sly.

CLOUDS AND MOUNTAIN WINDS.—The red arrow OVER THE SEA shows that cir-c. were moving from the S.Wd. over a S.Wly. wind to the Nd. of Bermuda. No. 208 (to the Wd. of the Bay of Biscay) had cir.-s. stationary over a Wly. wind.

In EUROPE, Dovre had a Sly. wind with Nly. and Wly. lower winds near; Chaumont and Julier had a very light S.Wly. wind, and St. Gotthard a fresh Sly. breeze; Julier had clouds from the Nd.

Over AMERICA the upper clouds were chiefly from N.W., W., or S.W. Mounts Mitchell and Washington had strong N.Wly. breezes.

The ISOTHERMS of 50°, 60°, and 70°, dip to the Sd. with the Nly. wind of the hurricane; that of 80° is shown again in the S.W. monsoon near the Equator.

Temperatures of 84° to 85° were recorded on the W. Coast of Africa, and others of 84° to 86° near the W. Indies, whilst 76° was experienced near the Equator and in the Gulf of Guinea.

AUGUST 27, 1873.

This day had the HIGHEST PRESSURE (30·38) to the S.Wd. of the Azores. To the Nd. of the area of highest pressure there were still the remains of the area of low pressure which was related to the hurricane, and the area of lower pressure in the neighbourhood of the British Islands. There was an area of high pressure N. of the Lake District in

America, also a ridge of high pressure between the two low pressures over the Atlantic, and an area of high pressure in Lapland. The winds were governed by this disposition of pressure; there was a whole N.Ely. gale in Iceland, and a moderate Wly. to S.Wly. gale near the Bay of Biscay, whilst further to the Sd. the winds were light and variable.

The N.E. TRADE is first shown in 33° N., where it was a fresh breeze. To the S.Wd. of the Cape Verds there was a light N.Ely. breeze, whilst further to the S.Wd. there was a light Wly. breeze.

At Sombrero, in the WEST INDIES, the barometer had risen, the S.Ely. wind had freshened, and it was overcast with rain.

At BERMUDA the barometer had fallen very slightly, and a S.Wly. breeze prevailed there, as well as to the Wd. and Nd. of those islands.

The remains of the hurricane still hung in the neighbourhood of Newfoundland. The following extracts from logs will be interesting.

No. 168 (S. of Newfoundland) was beating to windward against a strong W.N.W. breeze; at midnight, 27th, it moderated; at 9 a.m., 28th, it veered to N.W., when she stood to the W.S.W. at the rate of 6 knots an hour, and kept a steady wind for 12 hours.

No. 40 (to the Ed. of No. 168) was also a sailing ship bound to Quebec. The following are extracts from her log:—

	Barometer.	Wind.
27th, 3.30 p.m.	29·70	S.W., more moderate.
„ 9.30 „	- -	West 4 to 5.

No. 36 (to the S.Ed. of No. 40) was steaming to the E.N.Ed. about 11½ knots an hour; she had a gradually falling barometer until midnight 27th. The following are extracts from her log:—

	Barometer.	Wind.
27th, 4 p.m.	- -	S.S.E. 5.
„ Midt.	29·72	S. 5.

NOTE.—This was the lowest reading of the barometer, from this time it rose, and the wind veered to the Wd.

No. 32 (to the N.Ed. of No. 36) was steaming 12½ knots an hour to the W.S.Wd. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
27th, 4 p.m.	- -	S. by W. 4.	
„ 6 „	- -	S. by E. 5.	
28th, 1 a.m.	29·72	W. by N. 6.	There had been very heavy rain at 11 p.m., 27th. From the time that the wind shifted, the barometer gradually rose, and the wind veered more to the Nd.

NOTE.—Nos. 93 and 94 (to the Sd. of No. 32) were also steaming to the W.S.Wd. They both experienced the falling of the barometer and backing of the wind to the S.Ed., followed by a rising barometer and veering of the wind to the N.Wd., which were recorded by No. 32; the Chart shows that Nos. 100 and 276 were experiencing the

S.Ely. wind at the time of the Chart. No. 93 got the change about two or three hours before No. 94. These changes indicate that a slight secondary depression, with its corresponding changes of wind, passed to the N.Ed. over this part of the sea; such subsidiary depressions are common in the neighbourhood of the depressions which pass over the British Islands.

No. 9 (to the Nd. of No. 32 and steaming towards New York) had a fresh breeze veering to W. and N.W. with a rising barometer.

No. 10 (to the Ed. of No. 9 and steaming towards Glasgow) had a moderate Sly. breeze backing to the Ed. with a rising barometer.

No. 70 (to the N.N.W. of No. 10) was steaming 12 to 13 knots an hour to the W.S.Wd. for Belle Isle. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
27th, 5.30 p.m.	-	South 3.	
„ 9.30 „	? 29·72	„ „	
28th, 1.30 a.m.	-	S.E. 1 to 2.	
„ 3.30 „	? 29·67	?	Light breeze and dense fog. Slowed engines to 7 knots until 6 a.m.

NOTE.—After this the barometer rose, and she had light N.Ely. airs and a calm.

No. 68 (to the E.N.E. of No. 70) was also steaming to the Wd. at a rate of nearly 12 knots an hour; she did not always record the direction of the wind, but it continued light and veered to the Sd. and S.Wd., the barometer falling slightly.

In the Gulf of St. Lawrence, where heavy N.E. gales prevailed on the 26th, the wind had lulled and the weather improved.

No. 69 was steaming to the S.Ed. towards Cape Ray at the rate of 12 knots an hour. The following are extracts from her log:—

	Barometer.	Wind.	Remarks.
27th, 2 p.m.	30·03	North 6	Cape Ray distant 4 miles.
„ 9 „	29·90	N.W. 6	Fine, with smooth sea.

NOTE.—Hence about an hour after the time of the Chart the wind had backed from N.E. 6 to N. 6.

No. 39 (to the Nd. of No. 69) and steaming 7 to 8 knots to the Ed. for Belle Isle, had a light Nly. wind and cloudy weather; she passed a great number of icebergs.

NOTE.—All logs of ships in the neighbourhood of Newfoundland have been carefully examined, with the object of discovering whether the hurricane died out there, or passed on to some other region. All evidence goes to show that it gradually filled up after coming in contact with the land, and that the slight area of low pressure, with moderate winds around it, which is represented in the neighbourhood of Newfoundland on the Chart of the 27th, shows all that was left of the great hurricane.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen slightly, or was steady; the wind was very light N.Ely. to Ely., and the weather fine.

On the COAST OF AMERICA, between 30° and 35° N., the barometer had fallen, and the wind was S.Wly. with fine weather. Further to the Nd. the barometer had risen very

decidedly, apparently under the influence of another area of high pressure which was travelling to the S.Ed. from the Lake District; the winds along the coast were consequently E. to N.E. and the weather fine.

The INLAND WINDS OF AMERICA in the North were chiefly governed by the area of high pressure already alluded to; in the South they were variable.

CLOUDS AND MOUNTAIN WINDS.—The red arrow OVER THE SEA near Greenland shows that cir. were coming from the S.Wd. over a calm. Besides the above at 8.30 a.m., No. 215 had cir.-s. from W.N.W. above a S.by W. wind near the bay of Biscay; and at 9.15 p.m., No. 197 had cir. from N.N.W. above a N. wind near the Canaries.

In EUROPE, Dovre had a moderate gale from the Sd., with lower winds from the Sd. near: Chaumont had light S.Wly., St. Gotthard light N.Wly., and Julier very light S.Ely. winds; St. Gotthard had clouds from the Sd., and Julier had them from the Nd. Munich had clouds from the Wd. above a light N.Ely. air.

Over AMERICA the upper clouds moved chiefly with the lower winds. Mount Mitchell had a strong N.W. breeze, and Mount Washington a moderate gale from N.E., which was probably caused by the high pressure to the Wd. of it.

The ISOTHERMS are still very similar to those of previous days; those of 60° and 70° are very near together on the Wn. side of the Atlantic.

On the W. Coast of Africa St. Louis had a temperature of 87°, whilst at Goree it was only 77°. In the neighbourhood of the W. Indies there was a reading of 87°, whilst 77° was recorded in the Gulf of Guinea.

AUGUST 28, 1873.

This day had the HIGHEST PRESSURE (30·43) in the neighbourhood of the Azores, whilst 30·33 was recorded on the East Coast of America.

To the Nd. of the area of highest pressure there was an area of low pressure to the Ed. of Newfoundland and Labrador (probably the remains of the hurricane), and another over the British Islands. A ridge of high pressure lay between them, and this disposition of pressure governed the winds which amounted to a strong gale to the S.Wd. of the British Islands. There was also still an area of high pressure in Lapland. This day's Chart shows two systems of N.Wly. wind lying N. and S. of each other, one related to an area of low pressure near Ireland, which was passing to the N.Ed.; the other near Cape Finisterre, and related to the almost permanent area of high pressure in the centre of the Atlantic. The difference between the travelling and the almost permanent N.Wly. winds needs careful consideration when dealing with the winds and weather of this part of the sea and the neighbouring coasts. No doubt the more permanent N.Wly. winds are most common in summer, when the area of high pressure in the Atlantic is at its most Nn. limit. The branching of the winds and isobars off Cape Finisterre is well shown on this day's Chart.

The N.E. TRADE extended from 35° N. to the Cape Verds; in the same latitude as these islands, but in 55° W., it had the force of a strong breeze from E.

NEAR THE WEST INDIES the barometer had risen, the wind was fresh to moderate from E., and the weather fine.

At BERMUDA the barometer had risen, the wind had veered more Wly., and the weather was fine.

There are no signs of the hurricane, unless the shallow area of low pressure to the Ed. of Newfoundland and Labrador may be considered as the remains of it; this area does seem to have crossed the Atlantic and to have been near the British Islands on the 31st and near Norway on September 2nd, but no wind stronger than force 6 is recorded in connexion with it while over the sea, and it only attained an extreme force of 7 at Liverpool and of 8 at the Scaw. See its track on Diagram 1, which follows the Charts.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had risen, the wind was light and variable N.Ely. to S.Ely., and the weather generally fine.

On the COAST OF AMERICA the barometer had risen, most in the N.; the wind was Sly. in the South, then Ely. to N.Ely. and N.Wly. round the area of high pressure which lay in about 40° N.

No. 88, near the coast and in about 35° N., recorded a strong gale from E.S.E., with vivid lightning in the early morning; she was a sailing ship bound to the N.Ed., at the same time the current was driving her 3 knots an hour to the N.Ed., which would make the wind appear stronger, so that it is hardly probable that her wind was stronger than 8 at the very most. This Ely. wind seems to have been caused by, or at any rate related to, an area of abnormally high pressure to the Nd., and not to an abnormally low pressure to the Sd.

The INLAND WINDS OF AMERICA were in many places fresh in force, but from various directions, indicating a disturbed state of pressure.

CLOUDS AND MOUNTAIN WINDS.—There are no records of the motion of upper clouds OVER THE SEA.

In EUROPE, Dovre had a strong South breeze, with light Sly. winds at the lower stations to the Sd. and a strong Nly. breeze to the Nd. Chaumont had a fresh S.W., St. Gotthard a light South, and Julier a light S.E. breeze with clouds from North. Brussels had clouds from S.W. over a S.S.W. wind, and Munich from the same direction over a calm.

Over AMERICA the upper clouds were chiefly from the Wd. in the North, though in the Lake Districts there were two instances of their being from the S.Ed.; in the S. they were chiefly from S.W. or S. Mount Mitchell had a fresh breeze from S.W., with cum. from S., whilst Mount Washington had a gentle breeze from E.

The ISOTHERMS remain very similar to those of previous days.

On the W. Coast of Africa, St. Louis had a temperature of 89°, whilst at Goree it was only 82°. In the neighbourhood of the W. Indies a reading of 89° is recorded, whilst 77° prevailed in the Gulf of Guinea.

AUGUST 29, 1873.

This day had the HIGHEST PRESSURE (30·50) in the centre of the Atlantic, whilst 30·37 was recorded on the East Coast of America.

To the N.Wd. of the area of highest pressure there was the area of high pressure near America, which had on its N.En. and En. sides a system of N.Wly. winds veering to N.Ely., similar to that which exists near the Bay of Biscay and Coast of Portugal on the N.En. and En. sides of the more permanent area of high pressure in the centre of the Atlantic. Then again the slight depression, which was apparently the remains of the hurricane, is just shown in the centre of the Atlantic, where there were light to strong breezes. The area of low pressure which lay over the British Islands on the 28th had advanced to the N.Ed.; it had strong S.Wly. and S.Ely. winds respectively on the sides which were near to the areas of high pressure in the South and N.E.

There was the usual branching of the isobars and wind in the Bay of Biscay, and the N.E. TRADE extended from 35° N. to a position W. from the Cape Verds; it seems to have been stronger than usual, and it will be seen that the barometer in the area of highest pressure in the centre of the Atlantic, stood higher than it had been for some days. To the Sd. of 15° N. the Trade was drawn into a Nly. wind, and seems to have been in close contact with the S.W. monsoon.

NEAR THE WEST INDIES, at Barbadoes, the barometer had fallen, but further to the Nd. it had risen, and the wind had freshened and drawn more Nly.; the weather was fine.

At BERMUDA the barometer had risen more than a tenth, probably under the influence of the area of high pressure which was near the American Coast; the wind was light and variable, and the weather fine.

Near the BAHAMAS, CUBA, AND FLORIDA there had been a decided rise of the barometer amounting to nearly a tenth of an inch in some places; the wind was E. to N.E. and had increased in force, whilst the weather was generally fine.

On the COAST OF AMERICA the barometer had risen, most in the South, between 30° and 35° N., where the change was more than a tenth of an inch; the wind was chiefly governed by the area of high pressure in the neighbourhood, being S.Ely. or Ely. to the Sd. of it, and S.Wly. to N.Wly. on its Nn. side.

The INLAND WINDS OF AMERICA were from different quarters, those in the N. being chiefly governed by the area of high pressure already alluded to, whilst those in the S. were very much from the Nd. or N.Ed.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir.-c. were moving fast from N.N.W. over a N.W. wind to the Ed. of Newfoundland; and cir. from N.E. over a N.E. wind to the Sd. of the Canaries. Besides the above, at 9 a.m. No. 208, to the Wd. of Portugal, had cir.-s. stationary over a calm; at 4.15 p.m. No. 215, near Cape Finisterre, had cir. from N.N.W., wind W.byS.; and at 9.30 p.m. No. 186, in about 6° N. and 21° W., had a bank of clouds from N.W. over a S.byE. wind.

In EUROPE, Dovre had a calm with light winds near; Chaumont had a fresh Wly. gale; St. Gotthard a fresh Nly. breeze; and Julier a very light S.Wly. wind, with clouds from the Nd.; in their neighbourhood there were fresh S.Wly. lower winds. Munich had clouds from S.W. over a fresh Wly. wind.

Over AMERICA the upper clouds were from various directions, but S.W. prevailed. There was a fresh S.W. wind over a calm at Mount Mitchell, whilst at Mount Washington, in the neighbourhood of the high barometer, it was calm.

The ISOTHERM of 70° is driven to the Sd. by the Nly. wind on the Wn. side of the Atlantic.

A temperature of 86° is shown on the W. Coast of Africa and of 85° in the neighbourhood of the W. Indies and to the Ed. of Florida, whilst 77° was recorded in in the Gulf of Guinea.

AUGUST 30, 1873.

This day had the HIGHEST PRESSURE (30·39) in the centre of the Atlantic, whilst the barometer of No. 267, to the Nd. of Bermuda, was 30·32.

To the Nd. of the area of highest pressure there were several ridges and hollows of pressure accompanied by N.Wly., Wly., and S.Wly. winds, which follow the lines of the isobars. Observations were scarce in the Nn. part of the North Atlantic, but the N.Wly. wind which extended over nearly 10 degrees of latitude in about 40° W. indicates that the ridges and hollows may have extended over several degrees of latitude, as shown in the case of the one near the British Islands and Norway. The low pressure which is indicated in about 55° N. and 35° W., by the direction of the wind, is supposed to have been the remains of the hurricane, but no force above 5 of Beaufort's scale is shown there.

The N.E. TRADE was blowing between 35° N. and 18° N., and amounted to a strong breeze in several instances. To the Wd. of the Cape Verds Nly. and S.Ely. winds were in close contact.

Near the WEST INDIES the barometer seems to have been generally steady, the wind was light to a strong breeze from E.N.E., and the weather generally fine.

At BERMUDA the barometer had risen slightly, the wind was fresh from the Ed., and weather fine. There were light variable airs to the Sd. of that Island.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer had decidedly risen, the wind was light to fresh from E., N.E., or S.E., and the weather fine.

On the COAST OF AMERICA the barometer had risen in the South, but fallen considerably to the Nd. of 39° N., the winds were light and variable in the S., but Wly. to S.Wly. further to the Nd., where they followed the isobars over a slight ridge of high pressure.

The INLAND WINDS OF AMERICA were chiefly light and from various quarters.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from S.E.byS. over a S.Ely. wind in Davis Straits; cir. from N.N.W. over a Wly. wind near the coast of Portugal; and cir. from the Wd. over an E.N.E. wind, in about 19° N. and 55° W.

In EUROPE, Dovre had a strong S. breeze, with strong Sly. winds at lower stations near; Chaumont had a storm from S.W., St. Gotthard a light wind from N., and Julier a very light wind from S.W. with clouds from N. Munich had a whole gale from W. at the same time.

Over AMERICA the upper clouds were chiefly from N.W., W., or S.W.; Mount Mitchell had a fresh breeze from N.W., and Mount Washington a moderate gale from the same quarter.

The ISOTHERMS resemble those of previous days.

A temperature of 85° is shown on the W. Coast of Africa, and one of 86° at Cay Sal to the Nd. of Cuba, whilst 75° was recorded in the Gulf of Guinea.

AUGUST 31, 1873.

This day had the HIGHEST PRESSURE (30·39) to the Wd. of the Azores; there was also a high pressure in the neighbourhood of Bermuda, Florida, and the Southern States of America.

To the Nd. of the area of highest pressure the winds were chiefly governed by two areas of low pressure having a ridge of high pressure between them. One low pressure had its lowest readings near Labrador, the other near the West Coast of Ireland. That near Ireland is supposed to have been the remains of the hurricane. Paucity of observations makes it very difficult to give its position, which may have probably been further West than that given on Diagram 1.

The N.E. TRADE extended from the Coast of Spain to the Cape Verds, though there were strong Sly. breezes in the centre of the Atlantic. The S.Wly. monsoon to the Sd. of the Cape Verds and in the Gulf of Guinea was generally light and variable.

Near the WEST INDIES the barometer seems to have been steady, the wind was N.Ely. to Ely., and the weather generally fine, though there was a thunderstorm at Barbadoes.

In the neighbourhood of BERMUDA the barometer had fallen slightly, the wind was light N.Ely. or Ely., and the weather fine, though it was foggy at the island.

Near the BAHAMAS, CUBA, AND FLORIDA the barometer seems to have been generally steady, the wind light S.Ely. or Ely., and the weather fine. At Havanna the barometer had fallen, and there was a light Wly. air.

On the COAST OF AMERICA the barometer had fallen, chiefly in the N., where the fall amounted to more than ·2 in., the winds were chiefly S.Wly. under the influence of the low pressure in the North.

The INLAND WINDS OF AMERICA were from various directions.

CLOUDS AND MOUNTAIN WINDS.—The red arrows OVER THE SEA show that cir. were moving from W.S.W. above a Wly. wind to the Wd. of Brest; cum. from N.N.E. above a N.Wly. wind in 52° N. and 34° W.; cir.-c. from S.E. above a N.E. wind to the N.Ed. of the Cape Verds; and cir.-s. from S.W. above an E. wind near the West Indies.

Besides the above, at 4.45 a.m. there were cir. from N.N.E. above a N.W. wind with No. 215 off the Coast of Portugal.

In EUROPE, Dovre had a light S. wind with similar winds to the Sd. and a calm at Christiansund; Chaumont had a fresh S.W., St. Gotthard a fresh N., and Julier a very light S.W. breeze, with clouds from the N. Munich had clouds from the Wd. with a moderate N.W. breeze.

Over AMERICA the upper clouds were chiefly from the Wd., Mount Mitchell had a strong S.W. breeze over a calm, and Mount Washington a fresh gale from the Wd. with a fresh S.Wly. breeze at a lower station near.

The ISOTHERMS resemble those of previous days.

A temperature of 85° is shown on the W. Coast of Africa and 84° prevailed in the neighbourhood of the W. Indies, whilst 76° was recorded in the Gulf of Guinea.

REMARKS ON THE HURRICANE.

HAVING said a few words on each Chart, and made important quotations from ship's logs during the time of the hurricane, we will endeavour to sum up the various facts which may be learnt from such work, and propose to commence with those which relate to the hurricane.

A careful examination of the Charts from the 1st to the 10th shows that the N.E. Trade and S.W. Monsoon were often in close proximity over that part of the sea which lies to the S.Wd. of the Cape Verds. On the 11th, 12th, and 13th there was an imperfectly developed cyclonic movement in the winds in that locality. It seems most probable that the hurricane was forming in about 11° N. and 28° W. on the 12th, as appears from the Remarks for that day. The Remarks for the 13th show that an American ship had signs of a hurricane in about this position.

On the 14th, No. 110 is shown to have had a N.Wly. gale of nearly hurricane-force; other logs are quoted to prove the cyclonic nature of the wind, and the barometer observations show that there was an increased pressure of air from the Sd.

From the 15th to the 17th inclusive, during which time it is believed that the hurricane was moving to the Wd. along the Sn. edge of the central area of high pressure in the Atlantic, the atmospheric conditions of the high pressure area seem to have been much disturbed, and the barometer readings were lower than usual; perhaps the hurricane may have had something to do with this disturbance, if so, a daily report of the state of the barometer at the Azores may be useful for helping to give warnings of hurricanes. Further investigations such as this for August 1873 would probably throw considerable light on this and several other important subjects to which the present work has drawn attention.

The above are the main facts which can be brought to indicate the *origin* of the hurricane. After the 14th, absence of observations in the neighbourhood prevents any further notice of it until the 17th, except that on the 15th No. 87 (in about 14° N. and 34° W.) had a short confused sea *from all quarters*, showing that the hurricane had passed over her position.

On the 17th the barometer had fallen ·06 in. in 24 hours at Sombrero; the wind had backed from E. to N.E. and freshened to a strong breeze, with cloudy misty weather. At the same time No. 189 (south of Bermuda and steaming to the Sd.) was experiencing a S.Ely. swell, which seems to have been caused by the S.E. wind of the hurricane, as it was coming towards her from the S.Ed. As the hurricane was travelling to the N.Wd. its S.E. wind pointed in the direction of its track and blew over the same part of

the sea for some days, which gave it time to get up a higher and more distant sea than any other wind, and it will be noticed that the S.E. swell appears to have extended further than any other.*

On the 18th we have sufficient data for forming a fair estimate as to the position of the hurricane's centre; from which data, coupled with what is known of its formation near the Cape Verds, an estimation has been made of its track and position each day since the 14th. See Diagram 1 which follows the Charts; it gives the position of the centre of the hurricane for each day, as near as it can be ascertained. The daily remarks which have been made when alluding to each Chart give sufficient evidence of its existence from the 18th until the 27th, when it died out S. of Newfoundland; we shall therefore only further remark on certain important facts respecting the hurricane which are brought to light by this work.

On the 18th the falling barometer and N. wind at Sombrero, together with the high sea on the east side of the island, were sufficient warning that a hurricane was near; whilst the rising barometer, and backing of the wind to the Wd., which followed, showed that it had passed to the Nd. These facts might have been telegraphed to America if there had been telegraphic communication.

On the 19th, at the Island of St. Thomas, the upper clouds were moving from N.W. whilst the wind was W., as though the lower air curved more towards the centre of the hurricane than the upper. The way in which the air of the distant Trade was gradually drawn towards the hurricane is well shown on the Chart of the 19th; see the winds of No. 189 in 21° N. and 65° W., of Sombrero, of No. 117 in 20° N. and 60° W., and of No. 285 in 16° N. and 58° W.; these winds draw towards the hurricane, much as the winds of the N.E. and S.E. Trades draw towards the more permanent area of low pressure near the Cape Verds. The area of low pressure near the Cape Verds was probably more trough-shaped than that of the hurricane, and had most likely a lower pressure at its En. than at its Wn. end, the low pressure probably extended some distance into Africa.

On the 20th the wind at St. Thomas was S.Ely. whilst the clouds were from S.S.W.; this seems to show that the N.E. Trade was beginning to act on the lower wind, which was backing to the Ed., whilst the upper air continued more under the influence of the hurricane.

* The way in which hurricanes drive a swell before them and heap up water in confined spaces when their tracks remain for some days in the same direction, is well illustrated by the hurricane which blew in the Bay of Bengal during the latter end of October 1876. Its track was about N.N.E. for some days (instead of the ordinary N.Wly. track), pointing its Sly. wind in that direction; the result being an immense heaping up of water, accompanied by the flooding of a whole country, and the drowning of a large proportion of its inhabitants. See the Report of the Vizagapatam and Backergunge Cyclones of October 1876, by J. Eliot, Esq., M.A., Meteorological Reporter to the Government of Bengal, or a Chart, by Captain W. G. Stretton, in the Nautical Magazine for February 1877, p. 177.

On the 21st the hurricane was approaching Bermuda. It was quite clear to the inhabitants of that island that a hurricane was near, and at 6.20 p.m. (Greenwich time) of that day the lighthouse keeper remarked "Heavy gale passing S.W."; they had their lowest barometer with a *S.Ely.* wind at 6 to 10 a.m., 22nd, when the wind was S.E. 6, it had been E.S.E. 9. Hence they, as well as the residents at Sombrero, might have warned America of its existence if they had possessed the means; and it will be shown that they could have told of the hurricane's recurving to the N.N.E. early on the 24th, when the barometer was lower than on the 22nd, but with a *W.* wind.

But to return to the 21st, the Sly. sea of the hurricane was felt by No. 187, which ship was at least 500 miles to the N.Wd. of its centre; her light N.Ely. wind experienced on that day seems also to have been under the influence of the area of low pressure due to the hurricane, though her weather was very fine. The barometer had risen over that part of America which lay to the Nd. of the hurricane. A Chart on p. 992 of the Report of the United States Chief Signal Officer for 1873, shows that most of the areas of high pressure which appeared in August passed to the S.Ed. along the Nn. side of the Lake District; this fact is important when considered in connexion with the track of the hurricane, as it shows that the meeting of the area of high pressure with the hurricane, which will be alluded to on the 22nd, might have been foretold.

There seems to have been another area of low pressure to the Ed. of the hurricane on the 21st, for No. 86, about 900 miles to the E.N.E. of the hurricane's centre, had a fresh S.S.E. gale, which had changed to N. by the 22nd. This area of low pressure was first indicated on the 19th, and seems to have moved to the N.N.Ed., it appears on the Charts of the following days; its track is shown on Diagram 1 which follows the Charts.

On the Chart of the 22nd more vessels are represented under the influence of the hurricane, and its limits on the Nn., N.En., and N.Wn. sides are pretty clearly defined. Ships at a distance of about 400 miles from its centre seem to have had the direction of the wind influenced by the hurricane, but their weather was fine. No. 187, 400 miles to the N.Wd. of it, had a heavy and increasing Sly. swell; whilst No. 279, nearly 600 miles to the S.Wd. of it, had a slight swell on the bar at Nassau. The Sly. swell experienced by No. 187 is well accounted for by the Sly. winds pointing in the direction of that ship, whilst the N.Ely. wind of No. 123 accounts for the swell at Nassau. The isobars are not sufficient to show the shape of the hurricane; still most of the wind arrows cut them in such a manner as to show an indraft towards the centre. Diagram 1 shows that the area of high pressure which met the hurricane on the 25th, was in about 50° N. and 105° W. on the 22nd.

The Chart of the 23rd still shows pretty fairly the limits of the hurricane on its Nn., N.En., and N.Wn. sides. Vessels distant about 300 miles from its centre seem to have had the direction of their winds affected by it. No. 187, nearly 400 miles to the N.Wd. of its centre, had a fearfully heavy S.Ely. swell, but a light N.Ely. wind and fine

weather. Nassau, 700 miles to the S.Wd. of it, had a heavy swell on the bar. No. 189, about 550 miles to the S.Ed. of its centre, had a N.W. swell which was most probably caused by the N.Wly. wind of the hurricane. The barometer observations were scarce, so that the isobars cannot be drawn to represent the distribution of pressure exactly, still the winds in most cases seem to show an indraft towards the lowest pressure. There was a gale from N.W. at Mount Washington, with light Sly. winds to the Ed. of it, which extended as far as Newfoundland, whilst there were fresh N.Ely. breezes in the St. Lawrence which were related to the area of high pressure now in the Lake District and moving to the Ed.

The Chart of the 24th shows a considerable extension of the influence of the hurricane, it will be seen by looking at the Chart of the 23rd that to the Nd. of the hurricane there was a space of about 10° of latitude and 15° of longitude over which the wind was chiefly light Sly.; this space was, as it were, taken possession of by the hurricane, and the N.W. wind at Mount Washington had freshened to hurricane force; at the same time pressure had *increased* in the Lake District. The area of low pressure had become elongated in a Nly. and Sly. direction, which leads to the idea that another area of low pressure was formed where the light Sly. wind prevailed on the 23rd, and that it combined with the low pressure of the hurricane to form the long area of low pressure which is indicated by the direction of the wind on the 24th; the extent and strength of the Nly. winds were greatly increased by the area of *high* pressure which lay in the N.W. and which was moving to the Ed. or S.Ed.

It seems probable that the hurricane spread suddenly during the early hours of the 24th; the following quotations from the Bermuda lighthouse register seem to throw light on this subject:—

	Barometer.	Wind.	
22nd, 2 a.m.	30·005	S.E. 9.	
„ 6 „	29·980	S.E. 6.	
23rd, 10 „	30·078	S.S.E. 6.	
„ 4 p.m.	30·064	S. 6.	
„ 8 „	30·022	S. 9.	
24th, 6 a.m.	29·930	S.W. 9.	
„ 4 p.m.	29·914	W. 9.	From this time the barometer rose and the wind lulled, veering to N.W. by 10 a.m. 25th.

Here we have the S.E. gale of the 22nd lulling and veering to S., whilst there was scarcely any appreciable fall of the barometer until 8 p.m. 23rd, at which time the S. wind freshened to a heavy gale, eventually veering to S.W. and W.; the barometer was at its lowest with the W. wind.

These facts seem to indicate that the hurricane moved to the N.Wd., passing to the S.Wd. of Bermuda, at the same time increasing its distance from the island, as the barometer rose and the S.E. wind lulled and veered to S. But between 4 and 8 p.m., 23rd, the S. wind freshened to a heavy gale, and the barometer fell until the wind had

veered to W.; this seems to indicate that the hurricane had changed its track to the N.Ed. and also increased in diameter.

It will also be seen by the following quotations from logs, that early on the morning of the 24th, when the wind was veering to the Wd. and the barometer falling at Bermuda, several ships to the N.Wd. of that island had a sudden burst of N.W. wind, which confirms the supposition that it had received a great extension, for it would not have increased in force on *both* sides if it had merely changed its track and not increased in diameter.

The following remarks show when the N.W. wind burst suddenly upon ships which were in about 40° N., and on a line extending from the East Coast of America to the E.N.Ed., see their relative positions on the Chart of the 23rd.

No. 187.	24th,	1	a.m.	The N.W. wind freshened in a moment to force 6 or 7, without warning, and blew some light sails away. Her lowest barometer, 29·95, was experienced at the same time. She was a sailing ship bound to the Wd.
No. 276.	„	? 2	a.m.	Breeze freshened up suddenly from N.W. The hour is not very clearly stated. At 4.30 a.m. it had a force of 8. Before 2 a.m. it had been S.Ely. She was a sailing ship bound to the Ed.
No. 190.	„	1	a.m.	Sudden squall and baffling wind. Her lowest barometer (29·96) was at the same time.
„	„	4.30	a.m.	Steady strong N.W. gale. She was steaming to the Wd.
No. 200.	23rd,	Midt.		A long arc of cum.-s., like a bank of snow with dark nim. under, extending from W. to E.N.E.; a very squally, threatening appearance, but it only resulted in a fine shower.
„	24th,	2.30	a.m.	Fog set in very dense but very low, clear overhead; saw the masts of two vessels above the fog.
„	„	4	a.m.	Fog cleared; wind, which had been N.W. 4, increased suddenly to a gale. Her lowest barometer (29·87) was at this time. She was steaming to the Wd.
No. 101.	„	2.20	a.m.	Calm.
„	„	3.50	a.m.	N. by W. A sudden shift of wind to the Nd.; squally, with vivid lightning, heavy thunder, and pouring rain. She was steaming 11 knots to the Ed.
No. 97.	„	4	a.m.	Strong N.byW. breeze, and overcast. Before this she had experienced light Nly. airs and dense fog. Her lowest barometer (29·79) was observed about this time. She was steaming to the Wd.

These facts seem to confirm the remarks just made on the Bermuda observations, and also to show that the N.Wly. wind appeared a little earlier with the Wly. ships than with those further to the Ed.

The following observations show that the Nly. wind was first experienced at the more Wn. land stations.

Nearly five degrees further to the North than the above-named ships, and lying nearly East and West of each other, are the land stations of Portland, Eastport, and Halifax. The daily bulletin of the U.S.A. Signal Service gives the following records of their first Nly. winds after the time of the Chart for the 23rd, when all were Sly. Of course the Nly. wind very probably commenced between the given time and that of the previous observation. The hours are Greenwich time as in all other cases.

		Barometer.	Wind.	
Portland.	23rd, 9.43 p.m.	29.94	N.,	16 miles an hour (brisk).
Eastport.	24th, 4.8 a.m.	29·80	N.W.,	10 miles an hour.
Halifax.	„ 0.43 p.m.	29·55	N.,	2 miles an hour. A ship's log gives Nly. 3 to 4 Beaufort notation at about 3 a.m.*

The following are from ships which were to the N.Ed. of Halifax, and show the times of their first Nly. winds :—

		Wind.	
No. 149.	24th, 4 p.m.	East 9.	She was a barque running to the Wd.
„	„ 5 „	N. by E. 9.	She hove-to on starboard tack.
No. 163.	24th, Noon	E. by S. 8.	Gale just commenced. This was a barque hove-to.
„	25th, Noon	N.N.E. 9.	The gale seems to have shifted from E. to N.N.E. at this time. She continued hove-to until noon 26th, when the wind shifted to W.N.W. and lulled.

The following are from ships in the river St. Lawrence, or the northern part of the Gulf, showing the times of their first Nly. winds; their positions will be found on the Chart of the 24th :—

		Wind.	
No. 146.	23rd, 4 p.m.	W.N.W.	Light airs. This was preceded by variable airs.
„	„ 10 „	N.N.W. 5.	She was bound to Quebec.
No. 80.	„ Midt.	N.N.W. 4.	Wind had been variable. This wind freshened to 5 or 6, and drew more Nly. and then Ely. She was a barque sailing from Quebec, her strongest wind was E.N.E. 6 at 8 p.m. 24th, after which time it was variable. She was still in the St. Lawrence.
No. 69.	„ 1 p.m.	Nly. 4.	She started from Quebec at this time, and was steaming 12 knots.
„	24th, 6 a.m.	N.N.Ely. 6, 7.	From this time it freshened into a heavy N.Ely. gale, which reduced her speed to 3 knots at noon of the 25th; it moderated midnight 26th.
No. 39.	23rd, 10 a.m.	N.E.byE. 4.	A steamer off Cape Pillar Light bound to Liverpool. The wind had been fresh from S.E.byS. Her N.Ely. wind freshened with rain.
„	24th, 5 a.m.	N.E. 6, 7.	Hard squalls, with heavy rain.
„	„ Noon	N.N.E. 9.	Heavy rain. Just passed Cape Magdalene.
„	„ 5 p.m.	„ 10.	Terrific squalls. Gale moderated at 8 p.m. 26th.

A comparison of the above quotations seems to show that ships and stations to the Wd. got the Nly. wind before those to the Ed., also that vessels in the neighbourhood of the St. Lawrence and northern part of the Gulf got strong Nly. winds before those

* The following are the hours of lowest barometer and strongest wind at the same stations :—

Portland.	24th, 9.43 p.m.	29·81	N.W.,	16 miles an hour (brisk).
Eastport.	„ „	29·56	N.,	35 miles an hour.
Halifax.	25th, 4.8 a.m.	28·99	N.,	29 miles an hour. A ship's log gives nearly the same data at about 6 a.m.

NOTE.—On the 25th, at 9.43 p.m., Portland records Barometer 29·75, wind S. 8 miles an hour. If this is a correct observation, it must have been due to something local, as it comes between two Nly. wind observations, and did not affect the other stations.

south of Newfoundland, which facts seem to indicate that the Nly. wind was partially caused by the area of high pressure which was travelling from the N.Wd. towards the hurricane, and that it was the great difference of pressure thus produced which caused the remarkably strong Nly. and N.Ely. winds which did so very much damage.

The Chart of the 24th shows an elongated system of wind, which, as already remarked, was probably caused by the close proximity of the area of high pressure to the hurricane. It is probable that the area of lowest pressure was also elongated, but the black dot on the Chart gives the best position for the lowest pressure which could be worked out from the data of that day.

It is not necessary to repeat the quotations from logs which have already been made in the body of this work when remarking on the Chart of the 24th, but if the reader will refer to them he will find that several ships near the centre of the hurricane had remarkable changes in the direction of the wind and action of the barometer, which indicate that various smaller eddies were experienced near the centre of the great whirl.

The Chart of the 24th also shows the S.Wn. side of another cyclonic wind on the N.En. side of the hurricane, which may have interfered with the hurricane in that direction; at any rate, from some cause or other, its N.Ely. winds extended much further North than its S.Ely., and the curve formed by the course of the air in the hurricane was more that of the figure 6 than of a circle. There is also a similar curve shown by the winds of the cyclonic system near the British Islands on the same Chart. This day's Chart has three cyclonic movements on it, and proves how impossible it is to say whether any given European storm came from America, or originated on the Atlantic, until experience has been gained by work similar to these Charts.

The Chart and Remarks of the 24th also show how greatly hurricanes are affected by the various dispositions of atmospheric pressure around them, which may modify their shape and the force of wind on their various sides. For instance, what would have been the effect on this hurricane if there had not been an area of high pressure to the N.Wd. of it, and also if there had not been another area of low pressure on its En. side. Such questions can only be answered by a steady continuance of such work.

The Chart of the 25th shows that the area of low pressure had become less elongated, or rather that the hurricane proper had advanced to the Nd., so that the gradient for a N.Ely. wind on its N.Wn. side had been increased in steepness by the proximity of the area of high pressure which lay to the N.Wd. of the hurricane, the result being a wind of such irresistible force that an immense amount of life and property was destroyed. The following is a summary given in Appendix III., p. 1,033, of the Report of the Chief Signal Officer, United States Army, for 1873:—

Names of Places.	Vessels damaged, stranded, or wrecked.		Lives lost on Land or Sea.	Amount of Property reported in Dollars.	Buildings damaged or destroyed.
	Small.	Large.			
Cape Breton - - - -	308	264	147	645,000	545
Gaspe - - - - -	40	2	—	—	Unlimited.
Labrador - - - -	Incalculable	8	126	Immense	—
Magdalen Isles - - - -	52	92	15	—	—
New Brunswick - - -	—	22	3	15,000	1
Newfoundland - - - -	20	2	—	—	2
Nova Scotia - - - -	10	149	40	38,000	349
Prince Edward Island - - -	5	58	160	—	—
Total - - -	435	597	491	698,000	897

Although the hurricane was more circular on the 25th than on the 24th, its Northerly winds still extended further N. than its Sly., so that the direction of the wind still forms a scroll on the Chart somewhat like the figure 6. The direction of the wind round the area of low pressure near the Bay of Biscay had also still the same shape.

The winds and position of the centre on this day have been used for the construction of the upper half of Diagram 2, which is alluded to at the end of these remarks on the hurricane. See Diagram 2 on page 88.

Hurricane broken up by its coming in contact with Newfoundland.—The Chart for the 26th shows that the centre of the hurricane was South of Newfoundland, but that it was broken in force. The most remarkable feature is that there was still a force of 10 in the Gulf of St. Lawrence, whilst near to its centre there was much less wind. It seems probable that contact with the land of Newfoundland broke up the great eddy, which had shown no signs of breaking up so long as it was over the open sea.* The wind arrows still cut the isobars at a great angle, indicating an indraft of air towards the centre.

The Chart of the 27th shows that the remains of the hurricane were still in the neighbourhood of Newfoundland, and that only in one instance did the force of the wind amount to a "fresh gale;" it was experienced by a ship on its S.En. side, she

* The Report of the Vizagapatam and Backergunge Cyclones of October 1876, already alluded to, shows that both cyclones were broken up by collision with land, and this is generally found to be the case. In these cases also, whilst they were in the act of breaking up, the winds at some distance from the centre were stronger than those nearer to it.

had a fresh S.Wly. gale which, as the remarks show, soon decreased in force and veered to W. This Chart also shows that there was a S.Ely. wind with Nos. 100 and 276 to the Sd. of the hurricane, and the remarks prove that it was related to a small subsidiary area of low pressure which passed to the N.Ed. over various ships in that direction. Such subsidiary areas of low pressure are common over the British Islands, moving as it were along the Sn. and S.En. sides of larger depressions. A careful examination of all logs in the neighbourhood of Newfoundland, and between that country and Europe, proves that the hurricane of which we have been speaking died out in Newfoundland, and did not pass on to Europe as had been supposed.

The Chart of the 28th has lost all signs of the hurricane, but there is a slight area of low pressure to the Ed. of Labrador, which may have passed to the Nd. from Newfoundland, and possibly may be the remains of the great hurricane. There is also an area of low pressure over the British Islands, which has a strong gale on its S.Wn. side; Diagram 1, which follows the Charts, shows that most probably this gale originated in about 36° N. and 54° W.

The Chart of the 29th shows a slight area of low pressure in about 40° W. which may be the same as the one which lay to the Ed. of Labrador on the 28th; this area may be traced to the British Islands on the 31st, and to Norway on September 2nd. Diagram 1 shows the probable track of this slight depression which passed from Newfoundland to Norway after the hurricane broke up on the 27th; paucity of observations makes it very difficult to follow this disturbance.

CONCLUSIONS DERIVED FROM A STUDY OF THE HURRICANE.

Origin of the Hurricane.—We have produced convincing evidence that this great hurricane originated over the sea somewhere to the Ed. of the West India Islands, and most probably in that part of the sea which lies to the S.Wd. of the Cape Verds, where the N.E. Trade and S.W. monsoon meet in August.

Possibility of warning America.—Its existence was known on the 18th at St. Thomas, a week before the damage was done on the American Coast, and on the 21st the residents at Bermuda were fully aware of its existence and could have foretold its track; from both of these places warnings might have been sent to America if telegraphic communication had existed.

Sudden Extension.—A great and sudden extension of the limits of the hurricane took place between the 23rd and 24th, the conditions of the 23rd being eminently favourable for such an extension, there being a light Sly. wind to the Nd. of the hurricane, and an area of high pressure approaching it from the N.Wd., the high pressure causing a great increase in the force of the Nly. winds.

Varying Force of Wind at Equal Distances from the Centre.—It is evident that the winds on its various sides differed in force and extent, as was to be expected from the disposition of pressure in its neighbourhood. This fact is well proved by the very strong Nly. winds of the 25th.

Track governed by the Disposition of Pressure over the Atlantic.—This hurricane seems to have followed the law which governs areas of low pressure over Europe, in passing *outside* instead of advancing *into* areas of high pressure; hence when it is known that a hurricane exists in the neighbourhood of the West Indies, it may perhaps be possible to predict its further track if the disposition of pressure is known over those islands, Bermuda, America, and the Azores. For instance, it seems probable that a disposition of pressure similar to that shown on the Chart of the 6th would have caused the hurricane to continue its course to the Wd., as is the case with some hurricanes, instead of curving to the Nd. round Bermuda. However, all such surmises need confirmation by more work of the nature of these Charts.

Meeting between Area of High Pressure and Hurricane.—It seems most probable that much of the destructive force of the Nly. wind, which did so much damage on the 25th, was caused by a meeting between an area of high pressure moving from the N.Wd. and one of low pressure connected with the hurricane which was coming up from Sd., and that more complete telegraphic communication would have made it possible to warn the coasts of the serious results to be expected from such a meeting, many hours before they experienced the gale.

Direction of the Wind with regard to the Bearing of the Hurricane Centre.—The rules for managing a ship in a hurricane are chiefly based on the estimated bearing of its centre from the ship. It has been customary to suppose that the centre always bears at right angles to the direction of the wind. This opinion is based on the fact that winds from all points of the compass are blowing at the same time in every hurricane.

Recent researches, however, show that most probably the air draws inwards towards the centre of the hurricane.* Meldrum (as appears from the lower part of the accompanying Diagram 2) has shown that this is the case with regard to some Mauritius hurricanes,† while the Rev. W. Clement Ley has worked out similar results from a large number of cyclonic winds in Europe.‡

The upper part of Diagram 2 is constructed from the wind observations and position of the centre of the hurricane given on the Chart for August 25th, as the position of the centre was well known at that time. These curves must not be mistaken for isobars, they only represent the course of the air in the hurricane, as indicated by the wind arrows plotted from the actual observations. They also illustrate for the seaman

* Both Redfield and Piddington believed that the air did incurve towards the centre of a hurricane, which is shown by Piddington's Sailor's Hornbook, p. 108, par. 120.

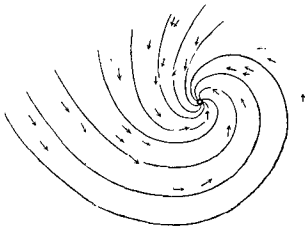
† In a specimen synoptic chart of the Indian Ocean for Noon, February 17th, 1861, by Mr. Meldrum, a hurricane is represented in the neighbourhood of Mauritius, in which the air seems to move still more exactly in curves similar to those in the lower part of Diagram 2. These very interesting Charts are it is believed now published.

‡ In the Quarterly Journal of the Meteorological Society for October 1877, p. 441, Table I., Mr. Clement Ley gives 63° as the mean angle between the direction of the surface winds of Cyclonic systems in Europe and a radius drawn from the central area of lowest pressure. This shows a mean indraft of 27° towards the centre. The mean of the 108 observations comprised in the three cases given in the following Table shows an indraft of 28°.

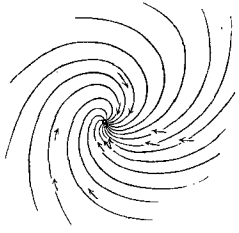
the importance of keeping the wind on the starboard quarter in the Nn. Hemisphere. for if he runs before the wind, and thus follows one of these curves, he will be likely to approach the centre of the hurricane. It will be seen that the upper figure, which is

DIAGRAM 2.

CIRCULATION of AIR in the HURRICANE when SOUTH of NEWFOUNDLAND, 25th August 1873.



CIRCULATION of AIR in a MAURITIUS HURRICANE, 25th February 1860.



plotted from our own observations, bears a remarkable resemblance to the lower part of the Diagram, after allowing for the difference of circulation in the two hemispheres. Mr. Clement Ley derives a similar figure from the cyclonic winds of these latitudes, which will be found in the Quarterly Journal of the Meteorological Society for October 1877, Plate XI., fig. 2.*

* As this work was passing through the press the Report of the Vizagapatam and Backergunge Cyclones already alluded to was received. By referring to its Diagram at 16 hours of October 31st, 1876, it will be seen that the wind arrows indicate a similar motion of the air in the cyclones of the Bay of Bengal.

TABLE of THREE CASES, showing the Angle (in Degrees) between the DIRECTION of the WIND and the BEARING of the CENTRE of the HURRICANE. Figures in italics are from OBSERVATIONS where the FORCE of WIND was below 7 of Beaufort's Scale (see the remarks following the Table).

Time.	10 p.m. 24th August 1873.				6 a.m. 25th August 1873.				0.45 p.m. 25th August 1873.				The Three Cases combined.				
Quarter of the Hurricane.	N.Em.	S.Em.	S.Wn.	N.Wn.	N.Em.	S.Em.	S.Wn.	N.Wn.	N.Em.	S.Em.	S.Wn.	N.Wn.	N.Em.	S.Em.	S.Wn.	N.Wn.	Four Quarters combined.
Prevailing Wind.	*S.Ely.*	*S.Wly.*	*N.Wly.*	*N.Ely.*	*S.Ely.*	*S.Wly.*	*N.Wly.*	*N.Ely.*	*S.Ely.*	*S.Wly.*	*N.Wly.*	*N.Ely.*	*S.Ely.*	*S.Wly.*	*N.Wly.*	*N.Ely.*	
Distance from centre, less than: — 100 miles		130°	111°		171°	99°	176°		86°	156°							
Observations Mean		1 130°	1 111°		1 171°	1 99°	1 176°		1 86°	1 156°			2 128°	3 128°	2 143°		7 133°
200 miles	114°	157°		115° 125° 134°					133° 111° 162° 143°	106° 112°	100°	132° 96°	94° 145° *106°*				
Observations Mean	1 114°	1 157°		3 125°					4 137°	2 109°	1 100°	2 114°	3 115°	3 111°	2 128°	2 114°	10 127°	17 123°
300 miles	*129°* *153°*			76° 126°	*125°* *123°* *127°* *132°*	71°	110° 98°	135° 120°	135° *119°*		99°	104° 147°					
Observations Mean	2 *141°*			2 101°	4 128°	1 71°	2 104°	2 128°	2 127°		1 99°	2 126°	8 131°	1 71°	3 102°	6 118°	18 118°
400 miles	*139°* *147°* *123°* *180°*	126°	*125°* 93° 114° 98° 110°	126° 88°	115° *179°*	87° *113°*	*122°* 107° 130°	142° 136°	168° *132°*	118°	118° 95° 92° 122°	115° 135° 121° *109°*					
Observations Mean	4 *140°*	1 126°	5 108°	2 107°	2 147°	2 100°	3 120°	2 139°	2 *150°*	1 118°	4 107°	4 118°	8 147°	4 111°	12 110°	8 120°	32 121°
500 miles		*123°*	77°	120° 93° 139°	121° *160°*		*131°*	82° *141°*	88°		*109°*						
Observations Mean		1 *123°*	1 77°	3 117°	2 141°		1 *131°*	2 *112°*	1 88°		1 *109°*		3 123°	1 *123°*	3 103°	5 115°	12 115°
600 miles			90° 99° *125°* 130°		*117°*			*119°*			117°						
Observations Mean			4 110°		1 *117°*			1 *119°*			1 117°		1 *117°*	–	5 112°	1 *119°*	7 114°
700 miles			*118°* *108°* 123°				92° *116°* 85° 79° *115°* *125°*	99°			110° *115°*						
Observations Mean			3 112°				6 *101°*	1 99°			2 *113°*		– –	– –	11 106°	1 99°	12 103°
800 miles			*115°* 111°				91°										
Observations Mean			2 113°				1 91°						– –	– –	3 105°	– –	3 105°
All distances from centre combined. Obs.	7	4	16	10	10	4	14	12	8	3	11	9	25	11	41	31	–
All distances from centre combined. Mean	139°	134°	108°	114°	137°	92°	113°	121°	118°	125°	109°	118°	132°	116°	110°	120°	–
The four quarters combined. Obs.	37				40				31								108
The four quarters combined. Mean	119°				121°				116°								119°

With the object of learning whether the hurricane with which we are dealing continued to exhibit similar relations between the direction of the wind and the bearing of the centre, we have fixed upon three times when the position of the centre of the hurricane was well known, and when the ships whose logs we have used were fairly distributed round it. The angle between a line drawn from the centre of the hurricane to the position of the ship, and another representing the direction of her wind, has been carefully measured in the case of each ship.

In the accompanying Table these angles have been grouped for each quarter of the compass and in zones according to the distance of the ship from the centre of the hurricane. The angles given in italics are those of ships which had a wind force under 7 of Beaufort's scale.

Hotchpotch means have been given in all cases, so that each observation has equal weight, otherwise a few observations in one quarter of the compass would have undue influence as compared with a larger number in another. The reader can easily take a mean of the quarterly means if it be preferred, and he will find that it generally agrees with the hotchpotch mean given in the Table, within 2° or 3°.

In considering the Table it must be remembered that the amount of indraft towards the centre of the hurricane can be found by subtracting 90° from the angle between the direction of the wind and the bearing of the centre. If the angle be less than 90°, its defect from being 90°, or complement, represents the angle at which the air was moving from the centre. A glance at the Table shows that this motion was very rare, and may have been the result of an erroneous observation, whilst indraft was generally experienced.

The lowest line of figures in the Table shows that the mean indraft in the three cases varied from 25° to 31°, or from $2\frac{1}{4}$ to $2\frac{3}{4}$ points, and the figures on the extreme right of that line show that the mean of the 108 observations included in the three cases gives an indraft of 29° or $2\frac{1}{2}$ points.*

Effect of Indraft on the Rules for managing Ships in Hurricanes.—Hence we may conclude that a ship running before the wind *in this hurricane* would have been almost sure to have had its centre bearing several degrees before her port beam (the mean angle being 29° or $2\frac{1}{2}$ points), and would therefore have been closing with its centre. These facts, taken together with the researches of Meldrum, Clement Ley, and others, would apparently make the following Table a closer approximation to the truth than that deduced from the idea that the wind in a hurricane blows in perfect circles.

In the Northern Hemisphere with the wind North, the centre of a hurricane probably bears		E.S.E.	or more	Sly.		
"	"	East	"	"	S.S.W.	" Wly.
"	"	South	"	"	W.N.W.	" Nly.
"	"	West	"	"	N.N.E.	" Ely.

The only modification of the ordinary instructions for handling ships in hurricanes

* By comparing the individual cases in the Table, it will be seen that there is a very great range in the amount of indraft; no doubt this is partly due to errors of observation caused by the difficulty in observing the absolute direction of the wind in a hurricane, though it is also probable that there really is a great range in the amount of indraft, so that the navigator can only consider the mean (or $2\frac{1}{2}$ points) as a rough approximation to the truth.

which these facts suggest is, that when the circular theory states that a ship ought to run before the wind, these facts show that, if possible, she ought to

Keep the wind well on the Starboard Quarter in the Northern Hemisphere;
" " Port " Southern "

because running dead before the wind would bring the ship nearer to the centre. Of course it is known that in extremely heavy gales there is danger of "broaching to" if the wind is brought on the quarter, so that the instructions to do this can only be followed in case the wind is not too strong.

Is Indraft greater in one quarter of a Hurricane than in another?—The above modification of the instructions relates to the fact shown by the above Table, as well as by the researches of others, viz., that *in all parts* of all hurricanes there is probably an indraft of wind towards their centres. Further research is needed before we can say whether this indraft is greater in one quarter of a hurricane than in another. The right-hand section of the last line but one of the above Table indicates that there was a greater indraft in the N.En. quarter of this hurricane, where the wind was S.Ely., than in the other quarters. This agrees with the researches of Clement Ley into the workings of the ordinary cyclonic winds of Europe. Meldrum, in speaking of the winds of a Mauritius hurricane, says, "For we now know that the N.Ely. and Ely. winds often, if not always, blow towards the centre."* It will be remembered that the N.Ely. wind of a Southern Hemisphere hurricane corresponds to the S.Ely. wind of one in the Northern Hemisphere.

Further research is needed on this subject, which may lead to a further modification of the rules. At present all we can do is to caution the navigator that in a Northern Hemisphere hurricane it is possible that the indraft may be greater with the S.Ely. wind than with its other winds.

Does Indraft increase as the Centre is approached?—The right-hand column of the preceding Table indicates that the indraft is greater near the centre than at several hundred miles from it. This is contrary to the opinion of many, who think that the wind blows more nearly in a circle as the centre is approached. More observations are needed before we can speak decidedly on this important subject. Still the very possibility of this being the case makes our suggested modification of the rules for the circular theory more important, because if a ship running before the wind goes more directly towards the centre the more she approaches it, it is the more necessary that she should increase her distance from the centre in the early part of the gale, when she can keep the wind on the quarter.

Practical Summary.—At the risk of a certain amount of repetition, we will sum up the practical results in a few words:—

1. There is strong evidence that the wind in a hurricane draws towards its centre.
2. The indraft is probably greater in one quarter of a hurricane than in another.
3. The indraft is possibly greater near the centre than further from it.

These facts suggest the advisability of the following modification of the rules for handling a ship in a hurricane.

* "Notes on the Forms of Cyclones in the Southern Indian Ocean," published by the Meteorological Office, p. 23.

When the circular theory requires that a ship should run before the wind to escape the centre, these facts suggest that she should

Keep the wind well on the Starboard Quarter in the Northern Hemisphere;
" " Port " Southern "

This modification is the more valuable, because it always tends to increase a ship's distance from the centre of a hurricane, whether the form of the hurricane be circular or not.

Mean Height of Barometer, and Force of Wind at given Distances from the Centre of the Hurricane.—With the object of finding the relation between wind force and pressure at various distances from the centre of the hurricane, the best available observations have been selected from the three cases which are given in the table on page 89. They yield the following results:—

No. of Observations.	Mean Distance from Centre.	Mean Barometer.	Mean Wind Force. (Beaufort's Scale).
7	80 miles.	28·56 inches.	10·4
11	164 "	29·11 "	8·1
9	258 "	29·50 "	7·9
17	342 "	29·71 "	6·7
9	454 "	29·90 "	5·8

By plotting this data, and drawing a freehand curve through the mean points, we get the following results:—

Distance from centre	Near centre.	50	100	150	200	250	300	350	400	450	500	Miles.
Mean barometer	27·95	28·35	28·68	29·01	29·28	29·48	29·63	29·73	29·83	29·90	29·95	Inches.
Difference in 50 miles	·40	·33	·33	·27	·20	·15	·10	·10	·07	·05		Hundredths.
Mean wind force	12·0	10·8	9·8	8·9	8·2	7·6	7·1	6·6	6·2	5·8	5·6	Beaufort's Scale.
Difference in 50 miles	1·2*	1·0	0·9	0·7	0·6	0·5	0·5	0·4	0·4	0·2		

Here, as might be expected, we have an increasing difference in the pressure and wind force as the centre is approached, though not so great as some shown by other writers. None of our observations were taken very near the centre. No doubt there is much variety in the steepness of barometer gradient and wind force in different hurricanes, and more work of this kind is needed.

Smaller Eddies near the Centre of the Hurricane.—Before concluding these remarks on the hurricane it may be well to call attention to the remarks of the 24th, which give quotations from various logs showing that certain vessels near the centre of the hurricane recorded sudden oscillations of wind between N.E. and S.W., accompanied by oscillations of the barometer, before they got the ordinary changes of wind from S.W. to W. and NW. which accompanied the passing of the centre of the hurricane to the N.W., North, and N.E. of them. These facts seem to indicate that there were smaller eddies near the centre of the great whirl. By referring to the upper part of Diagram 2, p. 88, it will be seen that with a ship hove-to on the N.En. side of such an eddy, and near its centre, if the eddy were travelling to the Nd. the wind would change from E. or even E.N.E. to S. and S.W.

* This difference would be in somewhat less than 50 miles, as it is generally calm in the neighbourhood of the centre.

NORMAL CIRCULATION OF AIR IN THE NORTH ATLANTIC DURING AUGUST 1873.

ALTHOUGH the chief object of this work is to throw light on the rise and progress of the hurricane, the Charts also illustrate the ordinary circulation of the air over the North Atlantic, and the neighbouring countries of North America and Europe during August 1873.

Area of Highest Pressure.—The most prominent feature on most of the Charts is an extensive area of high pressure in the centre of the Atlantic. This area was further North in the early than in the latter part of the month, its limits lay within the boundary line of the space so marked on Diagram 1. which follows the Charts. It was subject to various changes, especially during the passage of the hurricane to the Sd. of it. Near its centre is generally shown a large extent of uniform pressure where the winds are very light. The wind circulates round this, following the direction of the isobars, but drawing slightly out from the centre, instead of towards it as in the case of an area of low pressure. The Sargasso Sea lies on the S.Wn. side of this area of maximum pressure, and extends from about 20° to 40° N., so that the weed may be retained there by the circulation of the wind and current round it. The position of this area of high and uniform pressure is the same as that of the Calms of Cancer or the "Horse Latitudes," and it will be noticed that the gradient or difference of pressure over a given distance is various on its different sides.

We shall proceed to make a few remarks on the disposition of atmospheric pressure, winds, and weather which were experienced on its Nn. side, and then pass on to its En., Sn., and Wn. sides, thus completing the circuit.

Northern Side of Area of Highest Pressure.—The gradient is generally steepest and the isobars (or lines of equal pressure) are consequently nearest together on the Nn. side; the isobars are also generally much more irregular in their direction on the Nn. than on the other sides.

Several of the Charts indicate that waves of pressure travel along the Nn. side of this area of high pressure, and that the ridges and hollows of these waves generally extend in a Nly. or N.Wly. direction, their lowest pressures being respectively in their N. or N.Wn. parts; these waves seem generally to move to the N.Ed. or Ed. at the rate of from 12 to 30 miles an hour.*

* On the Charts for the 8th, 9th, 15th, 17th, and 18th, such ridges and hollows are partially represented. Diagram 1 gives the tracks of some of the most important areas of low pressure, some of which seem to be merely the hollows of waves. "The Admiralty Manual of Scientific Inquiry" contains a paper on "Atmospheric Waves," by W. R. Birt, Esq., F.R.A.S. The present Charts seem to throw some light on that difficult subject.

If we consider what would be the direction of the wind in accordance with Buys Ballot's law, supposing that a series of such waves passed over a given position, it will be found that as a ridge approached the station, the barometer would rise, the wind would be Nly. or N.Wly., gradually backing to W. as the top of the ridge passed; then as the Wn. or S.Wn. side of the ridge passed the station, the wind would back to S. or S.E. with a falling barometer; as the hollow or lowest pressure approached the wind would gradually veer to S.W. or W.; after the passage of the lowest pressure the wind would veer to W. or N.W. with a rising barometer caused by the approach of the En. side of the next ridge.

The general absence of rain (after the heavy shower which generally takes place as the wind veers from S.W. to W. or N.W.), and the dry, cool, clear weather which come with the N.Wly. wind of the En. side of a ridge, seem to indicate that it is possibly part of a descending current of air; whilst the warm, damp, rainy weather which comes with the Sly. wind on the Wn. side of a ridge, seems to indicate that it is possibly part of an ascending current. Mr. Clement Ley's researches into the motion of cirri in cyclonic systems support this theory; see his remarks quoted on p. 99 of this work.

Similar undulations of the air, with corresponding winds and weather, are experienced in high Sn. latitudes. The Marine Branch of the Meteorological Office is now engaged on the Meteorology of the Sea in the neighbourhood of the Cape of Good Hope. A partial inquiry into the gales of those latitudes during the Sn. winter month of July shows that 60% of those gales commence at about N.W., blow hardest from about W., and end at about S.W. by W. There is frequently a calm with a high barometer between the gales. These facts considered in connexion with Buys Ballot's law indicate that ridges and hollows (waves) of atmospheric pressure are passing from W. to E. near the Cape of Good Hope in July. A comparison of the times at which these gales struck the various ships indicates that they were moving at a rate of about 30 miles an hour. It is also well known that these waves are more frequent off the Cape, and their winds stronger, in the Sn. winter than in summer. In Mr. Meldrum's specimen Synoptic Charts of the Indian Ocean already alluded to, a case is shown in which the hollow of a wave of pressure, having Nly. winds on its En. and Sly. on its Western side, lay between 35° and 45° S. and in about 15° E. at Noon, February 14th, 1861; by Noon of the 17th it was in 51° E., having travelled at the rate of about 23 miles an hour. He also shows that ridges of high pressure travel similarly in that part of the sea.

Experience shows that such systems of wind, having no Ely. winds in connexion with them, are very common, a fact which confirms the supposition that such waves of pressure are also common, even though the number of barometer observations may not always be sufficient for representing their corresponding isobars. Ely. winds do, however, frequently occur in connexion with these waves of pressure, and we have evidence that cyclonic movements sometimes occur in the hollows of the waves, in which

case N.Wly. and S.Wly. winds extend over several degrees of latitude on each side of the trough. For illustration see the Charts of August 18th and 20th, which show slight Ely. winds in the hollows of waves.

In a letter to me on this subject, Mr. Clement Ley, says, "I entirely concur in what "you remark about cyclonic systems being formed in the 'troughs' which are between "'waves' of higher pressure, as represented in your letter. Do you not think it "possible that both the difference in the type of the 'gustiness' of the S.E. and N.W. "winds noticed by the late C. O. F. Cator, and the difference in the effects on the *sea* "noticed by several writers as regards the North Atlantic, may be due to the respec- "tively ascending and descending character of those winds." I certainly do think so. In our work on the Equatorial regions of the Atlantic, will be found several remarks on the gustiness and downward tendency of the air in the N.E. Trade, especially in Square 40.

Similar systems are shown on Captain Hoffmeyer's Charts published by the Danish Meteorological Institute and on the Daily Weather Charts published by the Meteorological Office. In fact these waves of pressure, with their accompanying winds and weather, seem to constitute a most important feature of the winds and weather of the British Islands and that part of Western Europe which lies immediately to the Ed. and N.Ed. of them.

Diagram 1 represents the tracks of some of the most marked areas of low pressure. Those over the sea are in fact generally hollows of waves, having ridges of high pressure on each side of them. In August 1873 areas of low pressure over the sea were most common to the Nd. of 55° N., where there were indications of several others besides those shown on Diagram 1.

N.En. end of Area of Highest Pressure.—At the N.En. end of the area of highest pressure there is generally a branching of the isobars, part going on to the Ed. and N.Ed., whilst others turn sharply to the S.Ed., Sd., and S.Wd., the winds follow the isobars so that to the N.Ed. of a Wly. wind there will be S.Wly. winds, whilst to the S.Ed. of it there will be N.Wly. and Nly. winds, the latter being due to a circulation of air round the area of *high* pressure, whilst the former are due to its being drawn towards an area of *low* pressure. This fact shows the importance of knowing the relative distribution of areas of high and low pressure when endeavouring to estimate the probable wind in a certain district.

It frequently happens that there is a N.Wly. wind near the W. Coast of Ireland which is due to the S.Wn. side of an area of low pressure passing over the British Islands, whilst there is another more permanent N.Wly. wind to the Sd. of the first named, and near Cape Finisterre, which is due to the N.En. end of the almost permanent area of high pressure in the centre of the Atlantic. The Chart of the 28th affords an illustration of this statement.

In the month of August 1873 the N.En. corner of the area of highest pressure lay very frequently near the entrance of the English Channel, causing a tendency for

N.Wly. winds there, which winds were not disturbed by the ordinary changes which passed over the British Islands from the Wd. This near approach of the area of highest pressure to the Channel in summer makes it probable that N.Wly winds may be strong there, whilst the neighbouring S.Wly. winds are relatively light. In winter, when the highest pressure often lies over France, S.Wly. winds may be the strongest.

The branching of the isobars to the N.Ed. above alluded to, in relation to the position of the N.En. end of the area of highest pressure in summer, may be related to the weather of France, for the French "Atlas des Mouvements généraux de l'Atmosphère"* shows that frequent thunderstorms passed to the N.Ed. over France in August 1865, and this is their general route.

Here it may be well to add that the relative heights of the barometers at the Azores and Lisbon would give good data for judging of the force of the Nly. winds which usually prevail between those stations.

S.En. and Sn. sides of Area of Highest Pressure.—On the S.En. side of the area of highest pressure the N.E. Trade prevails, it being generally an even flow of air gradually taking a more Easterly direction as it passes to the Sn. side of the area of highest pressure, whilst near the Cape Verds part seems to be drawn into a N.Wly. wind towards a lower pressure in Africa, so that here again is a branching of the wind.

S.Ws. and Ws. sides of the Area of Highest Pressure.—In the neighbourhood of the W. Indies the wind generally continues Ely. to N.Ely., whilst further to the Nd. and in the neighbourhood of Bermuda the wind is generally S.Ely. to S.Wly., so that here also there seems to be a branching of the air, part drawing round the area of highest pressure, whilst that in the neighbourhood of the W. Indies seems to be drawn towards a lower pressure which lies to the Sd. of those islands and over S. America.

Sea to the Ed. of N. America.—That part of the sea which lies between the area of highest pressure and the Coast of North America was subject to various winds which seem to have been sometimes related to the central area of high pressure in the Atlantic which caused S.Ely., Sly., or S.Wly. winds, at other times to areas of high or low pressure advancing over the sea from the American continent. On the 19th of August the great hurricane came into it from the S.Ed. and kept possession of it until the 26th.

Areas of High Pressure coming from America.—The Chart facing p. 992 of the Report of the United States Chief Signal Officer for 1873, shows that most of the areas of

* This Atlas is composed of Charts somewhat similar to those of this work, but it deals chiefly with land observations, and the remarks allude more to European weather than to that of the sea. Since this work was in the press M. H. Carlier of Saint-Martin-de-Hinx, Landes (which is in the S.En. angle of the Bay of Biscay), has published an elaborate and valuable discussion of 10 years meteorological observations at that place, which shows that the barometer is highest in winter and lowest in spring, but that there is a second maximum in summer when the range of pressure is remarkably small; the summer maximum seems to be related to the Nn. march of the area of high pressure in the Atlantic which takes place at that season. The above work also shows that the prevailing wind at Saint-Martin-de-Hinx is N.Wly., which seems to result from the position of the same area of high pressure.

high pressure in August came from a position north of the Lake District and travelled to the S.Ed.

Some of them (*e.g.* the Charts of the 5th to the 7th of August) cause a system of N.Ely. winds on the Wn. side of the Atlantic similar to those near Africa on the En. side of the more permanent area of highest pressure. The above-named Charts show that between the N.Ely. winds on the Wn. side of the Atlantic and the area of highest pressure in the middle of the Atlantic there was a system of S.Wly. winds; both the N.Ely. and S.Wly. winds were "anticyclonic," or due to areas of high pressure. Such S.Wly. winds seem to be accompanied by finer weather than those which are cyclonic, or round areas of low pressure.

Winds from all directions blow round areas of high as well as round areas of low pressure. For instance, in these islands we may have a S.Ely. or Sly. wind which is dry and cool, in which case it will most probably be found that it is blowing on the S.Wn. or Wn. side of an area of high pressure; such a wind differs materially from the warm damp S.Ely. or Sly. wind which blows on the N.En. or En. side of an area of low pressure; the latter or cyclonic wind being probably a partially ascending, and the former or anticyclonic a partially descending current of air.

It has already been remarked that the difference in the disposition of areas of high pressure over America and the neighbouring sea, is most probably related to the variety which is noticed in the tracks of hurricanes.

Area of Low Pressure coming from America.—The area of low pressure which came from the interior of America on the 14th did not seem to advance far over the sea, but to die out; and there is no evidence obtainable from these Charts, or from Diagram 1 which gives the tracks of areas of low pressure over land and sea, that any storm experienced in America in August 1873 crossed the Atlantic to Europe. The tracks in question lead to the supposition that European storms originate over the Atlantic. The tracks of various areas of low pressure shown over America in August 1873 are copied from a Chart in the Report of the United States Chief Signal Officer already alluded to.*

Area of Low Pressure near the Cape Verds and S.W. Monsoon.—Having considered the circulation of air on the various sides of the area of highest pressure, it may be well to allude to the area of low pressure which lies in the neighbourhood of the Cape Verds.

It seems to extend in a N.Ely. and S.Wly. direction, and to oscillate slightly to the Nd. and Sd., probably under the influence of the varying strengths of the N.E. and S.E. Trades. It seems to have the lowest pressure in the neighbourhood of the West Coast of Africa, towards which coast both the N.E. and S.E. Trades seem to be drawn,

* It is not to be supposed that this examination into the Atlantic data for only one month, can in any way settle the very important question as to the possibility of America being able to warn Europe of coming storms. This work only shows that no proof of such a power to warn is derivable from the data of August 1873, and points to the necessity for working up the data of other months.

forming N.Wly. and S.Wly. winds. See the Charts of the 2nd and 11th of August as illustrations. Diagram 1 shows its general position in August 1873.

The Charts of Meteorological Data for Nine Ten-Degree Squares of this part of the sea, lately published by the Meteorological Office, show that *prevailing* N.Ely. and S.Wly. winds are generally very near each other here in August (see Plate III. of that work), and these Charts for August 1873 indicate that most probably the hurricane we have been studying originated between those winds and in the neighbourhood of this area of low pressure. It seems probable that hurricanes, as well as the great cyclonic storms of higher latitudes, need a space of open sea for their full development, whilst coming in contact with land interferes with their circulation, and, when the contact lasts for some time, breaks them up. This was the case with the hurricane in question, and reference is given to other cases of the same kind.

Clouds and Mountain Winds.—In remarks on the normal circulation of the air, it seems necessary to say a few words on observations of the motion of clouds, and of mountain winds. Unfortunately we have very few such observations. America is, however, a favourable exception; there each station gives the "direction of upper clouds" (when visible) three times in the 24 hours, and all that is wanting is some record of their apparent altitude and speed.* America has also given observations of wind, &c., on the tops of Mounts Mitchell and Washington. Unfortunately the observations on Pike's Peak did not commence until after August 1873, they are, however, so interesting that those for one year have been quoted in Appendix B., and compared with those on Mount Washington for the same time. To these, brief allusion will presently be made, but the Appendix must be read to appreciate their value and the very interesting remarks of the "observer-sergeants."

Upper Cloud Observations over the Sea.—Over the sea upper cloud observations are *very rare*, still it is from such observations alone that we can hope to learn anything of the normal circulation of the upper currents of air there. A glance at the Charts of this work will show how much they would gain if each ship had observed the direction from which upper clouds came, and it is sincerely hoped that the manifest defects of this work will lead future observers to record them carefully, noting at the same time their apparent altitude and speed. Great care should be taken not to record the motion of *lower* clouds as of upper; if lower clouds move differently from the wind a special remark should be made to that effect.

The importance of such observations is well shown in Dr. Hildebrandsson's excellent paper "Sur les Courants Supérieurs de l'Atmosphère dans leur relation aux Lignes Isobarométriques," and in his "Atlas des Mouvements Supérieurs de l'Atmosphère."†

* We notice that cumuli are often recorded as *upper* clouds in America, whereas by us they are considered as lower. An instrument to record the altitude, direction from, and speed of clouds would be a great boon to meteorology.

† The first published by Ed. Berling, Upsala; the second by K. L. Beckman, Stockholm.

He specially asks for observations of the motion of cirri in relation to the direction of the wind in that part of the sea which lies to the Nd. of the central area of high pressure in North Atlantic. Unfortunately this work supplies very few in that region.

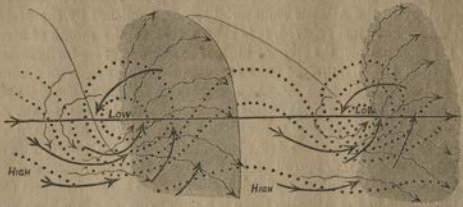
In spite of all deficiences the red arrows over the sea do seem to indicate that upper clouds frequently move from the Wd. or N.Wd. on the S.Wn. or Sn. side of the area of highest pressure in the middle of the Atlantic. This is interesting, because in the work on the Meteorology of the Atlantic Equatorial region, published by the Meteorological Office, to which we have just referred, it is shown that in the month of March (which is probably the month when the area of highest pressure is at its furthest Sn. latitude) upper clouds from the N.Wd. were more frequent than those from all other directions between 15° and 20° N., and from 30° to 40° W., whilst further to the Ed. upper clouds from S.W. were most prevalent. It seems therefore probable that to the S.Wd. and Sd. of the area of highest pressure upper clouds from the N.Wd. and Wd. do prevail, whilst it is well known, and some few observations on these Charts also show, that upper clouds from the S.Wd. prevail on its S.En. and En. sides. These facts lead us to suppose that on the S.Wn., Sn., and S.En. sides of the area of highest atmospheric pressure in the middle of the Atlantic, there is a circulation of air in the upper regions of the atmosphere counter to the lower winds. More observations are needed on its Nn. side, before we can say that the circulation is complete over the whole area.

Over the S.Wly. monsoon near the Equator a few observations exist, and these indicate that there is a N.Ely. upper current of air, which is also confirmed by the work already alluded to.

European Observations of Clouds, &c.—In Europe there are four mountain stations quoted, but scarcely any observations are given of the direction from which upper clouds move.

Mr. Clement Ley has written a paper on "The relation between the Upper and Under Currents of the Atmosphere around Areas of Barometric Depressions in Europe." It has already been quoted when speaking of indraft towards the centre of the hurricane, and will be found in the Quarterly Journal of the Meteorological Society for October 1877. Figure 2 of that paper gives a picture of the motion of lower winds and cirri in relation to the centre and track of the depression; it shows that the cirri move very much with the lower air where the wind is N.Wly. and Wly., but not where the wind is S.Ely. and Ely. Where the lower wind is S.Ely. the cirri move from S.W. and W., indicating that the air which has risen on the En. side of a cyclonic system, and no doubt consequently lost most of its moisture, passes away to the Ed., and may probably descend where the barometer is higher, to form part of the cold dry Wly. and N.Wly. surface winds. These facts seem to show that the ridges and hollows of the waves of pressure which are pictured on so many of our Charts are undulations caused by rising and descending currents of air, and that the ridge of high pressure which advances to the eastward in front of a hollow of low pressure, is probably chiefly formed by air which has risen on the En. side of that hollow.

In a letter on this subject Mr. Clement Ley says, "I fully agree with you that the "air in front of a cyclonic system rises and flows in the direction of the trajectory, to "form the ridge of air which advances in front of such a system. In the following "diagram I have tried to sketch out roughly the way in which I suppose it to do "this."



Dotted lines —Isobars or lines of equal barometric pressure. Words "High" and "Low" allude to atmospheric pressure.

Waved arrows—Upper currents of air, as shown by the motion of cirri.

Plain arrows —Under currents of air, or surface winds.

Shaded parts —Where there is a general *upward* movement of air.

Unshaded parts enclosed in plain lines—Where there is a general *downward* movement of air.

Long plain arrow—The trajectory, or track in which the ridges and hollows of barometric pressure are moving.

"The sketch shows two depressions with ridge between. The *well-marked edge* of the advancing shaded part represents the edge of the cirro-stratus bank, the mean position of which in relation to the isobars, upper and under current arrows, I have found, by working out a great number of instances, to be about what I have represented in this rough sketch."

"In the *rear* of a disturbance I think the upward and downward motions are much less regular, and run as it were into each other. This is the region of local squalls, and showers with dry cool air between them."

Seamen will appreciate the above remark, as they well know the sudden squalls and heavy rain, snow, or hail which come with a shift of wind from S.W. to W. or N.W. in the Northern Hemisphere and from N.W. to W. or S.W. in the Southern Hemisphere; the barometer rising suddenly at the same time, under the influence of the En. edge of an approaching ridge of higher pressure.

Mr. Clement Ley finishes by saying, "All this is no doubt *very* theoretical, but it is theory gained by constant observations of the movements and distribution of cirrus. I hope to give reasons more at full in my second paper."

The above quotation and diagram thoroughly illustrate my views on this important subject, and I am glad to have Mr. Clement Ley's permission to publish them. Probably his remark on the appearance of cirro-stratus in a well-marked position, may be used as a valuable prognostic of coming weather. Already cirro-stratus is considered to be a useful prognostic of weather, but its relation to an in-coming area of low pressure, when seen over a ridge of high pressure in these latitudes, has not so far as I am aware, been so well defined before.

American Upper Clouds and Mountain Winds.—Over America the general tendency of upper clouds was from the Wd. In Florida, however, and at the stations to the Sd. of that peninsula, the upper clouds were frequently from the Ed., moving with the lower wind; which indicates that the Trade wind prevails at a greater altitude in that locality than the lower winds of other parts. The mountain winds of America were chiefly from the Wd. Appendix B. shows that Mount Washington had 49 per cent., of wind from N.W. in August 1874, having a mean velocity of 36 miles an hour and an extreme of 75 miles; whilst in the winter months the N.W. winds amounted to 64 per cent., having a mean velocity in January of 43·5 miles an hour, and an extreme of 96 miles. Eventually the anemometer was blown down by a Wly. gale of 108 miles an hour.*

These furious N.Wly. gales on the summit of Mount Washington, which are intensified in winter, seem to be related to the heavy Wly. gales of the North Atlantic. A series of these Daily Charts for at least one year, in which a larger amount of better data might be brought into use, would probably throw much light on the subject, and help towards the discovery of the cause of these very strong upper currents of air, and their relation to the waves of pressure so common over the northern parts of the North Atlantic.

Isotherms.—The Isotherms of air are intimately related to the normal circulation of the air, as shown by their dipping to the Sd. with the prevailing Nly. wind on the En. side of the Atlantic, and by their curving to the Nd. with the prevailing Sly. wind on its Wn. side. This fact has been noticed in the daily remarks. The Isotherms are also affected by the temperature of the sea, for the highest air temperature over the sea is generally in the neighbourhood of the Gulf Stream, whilst the lowest in the Tropics is near the Equator, where there is a cold water current in August, and where readings below 70° are sometimes recorded. This is well shown by Plate III. in Official No. 27, published by the Meteorological Office, which has been already referred to.

Use of the Charts to Navigators.—The advantage of such Charts to Navigators is that they give a picture of what was going on over the whole Atlantic at the same moment of time. By comparing successive charts they also show any changes which had taken place during 24 hours.

For instance, the wave-like shapes of some of the isobars in high latitudes (being undulations of pressure which are followed by the wind arrows) illustrate for the Navi-

* The Remarks referring to the Chart for August 16th, 1873, allude to a wind of 100 miles an hour on the top of Mount Washington.

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gator the changes of barometer and wind which he so frequently experiences in these latitudes. The Chart of the 1st shews the ridge of a wave near Iceland, whilst on the 2nd its ridge was North of the British Islands, having passed to the Ed. at a rate of more than 20 miles an hour, and carried with it wind changes from N.W. to S. In a "Report to the Committee on the Meteorology of the North Atlantic," published by this office, it is shown that steamers bound to America pass through a large number of these undulations, whilst those from America experience comparatively few of them. Hence the steamer bound to the Wd. will have much *quicker* changes of barometer and wind than one steaming to the Ed., because the latter is to a certain extent moving with the undulations. So that in these latitudes a fast-falling barometer in a ship steaming to the Wd. is not so great a sign of bad weather as it is when steaming to the Ed., because in the first case the mere speed of the ship to the Wd. often increases the rate of fall of the barometer; whereas the speed of a ship to the Ed. tends to make the barometer fall more slowly than it otherwise would do, or even to rise. It is no uncommon thing for steamers bound to the Ed. to have a rising barometer with a Sly. wind, which rarely, if ever, occurs when steaming to the Wd. Of course the barometers of sailing ships are similarly affected, but, as their speed is not generally so great as that of steamers, the change is not usually to the same extent. The above-named Report gives further particulars on this subject.

Passing on to the 5° Square, which lies between 45° and 50° N. and 10° and 15° W. Maury's North Atlantic Pilot Chart shows that it has nearly 40 % of N.Wly. wind during the summer months. Our Charts account for this fact by showing that in August the square generally has the central area of highest pressure immediately to the S.W. of it, and Buys Ballot's law requires that there should be N.Wly. winds in such a position. Again, our Charts show that the winds to the Ed. of the Cape Verds are generally lighter than those which are experienced to the Wd. of them; this fact is even more marked in other months, as shown by the charts of the work on nine ten-degree squares published by the Meteorological Office. Hence we have the reason why the voyages of ships from Europe to the Equator are shorter when they pass to the Westward than when they pass to the Ed. of the Cape Verds, the fact was worked out by Maury from the comparison of the passages of a large number of ships.

Once more, Maury by comparing a large number of logs found that American ships bound to the Equator lost time by steering so much to the Ed. before they steered to the Sd. These Charts show the reason why this was the case, viz., because by steering to the Ed. they were going towards the area of highest pressure, where there is very little if any barometer difference, and therefore little or no wind.

These Charts also show that ships bound to Europe, after crossing the Equator and getting the first of the N.E. Trade, will be driven to the N.Wd., but that, as the wind is more Ely. on the Wn. than on the En. side of the Atlantic (and often even S.Ely.), they will gain by going to the Wd., so that they will be wise to keep their yards "well in" and their sails "well full." By going to the Wd. in August we see that they are also more likely to avoid running into the patch of high and uniform barometric pressure,

where it is frequently calm, but instead they will probably get the S.Ely., Sly., and S.Wly. winds which exist on the S.Wn., Wn., and N.Wn. sides respectively, of the area of highest pressure. More work of this kind will show whether this is equally true in other months. Old Navigators have got a general idea of these facts from experience, but these Charts illustrate their cause, and make the information clear to a young beginner.

The Commander of a weak steamer bound from the Equator to Europe will see at once the advantage of not steaming up the En. side of the Atlantic against the almost constant Nly. wind, when a few degrees further to the Wd. the wind is more Ely. and lighter, and eventually will most probably become Sly., and a fair wind.

It is the opinion of many Meteorologists that Daily Charts like these for August 1873 are of the greatest importance for the study of Meteorology, one important reason is that the results are not affected by the numerous difficulties which crop up when dealing with the means of a large number of observations which are spread over several years, and recorded by ships which are retained observing in nearly the same position by one wind, but carried quickly away by another. It is believed that by the help of the Captains, Officers, and Owners of ships a much larger amount of better observations could be collected, so that similar Charts for a longer period might be compiled for the North and South Atlantics, if not for other parts of the world.

We have no doubt but that the logs of all vessels trading in those Oceans would be lent to the Meteorological Office if application were made to their Owners as in the case of this work, and that their Captains and Officers would help the work by endeavouring to improve their logs for the purpose, if a special notice were sent to them stating what information is needed, and that their logs will be borrowed on their return to the United Kingdom.

We will close these remarks by repeating the thanks of this Office to those gentlemen who have so kindly contributed data for this work.

APPENDIX.

APPENDIX A.

The following is a List of Ships from which Logs have been received for this Work. It gives the Names of the Captains, Owners, and others to whom the Office is indebted for the information :—

Ship's Number on the Charts.	Ship's Name, &c.		Captain's Name.	Leader of the Data.
1	Yorkshire	Sailing	F. Anderson, R. N. R.	Money, Wigram, and Co.
2	Lincolnshire	,,	?	
3	Bayswater	,,	D. Evans	Smith, Bilbrough, and Co.
4	Anglia	S. S.	J. J. Small	Henderson Brothers.
5	Australia	,,	J. Hedderwick	
6	Europa	,,	A. Campbell	
7	India	,,	J. R. Mackay	
8	Napoli	,,	D. Edwards	
9	Olympia	,,	H. Young	
10	Trinacria	,,	R. Thomson	
11	Victoria	,,	R. D. Munro	
22	Oberon	,,	J. Canny	T. and J. Harrison.
23	Fire Queen	,,	?	P. and O. Steam Navigation Co.
24	Golconda	,,	S. D. Shallard	
26	Venetia	,,	W. C. Angore	
27	City of Quebec	Sailing	J. Binnie	Montgomerie and Greenhorne.
28	Ambrose	S. S.	J. Jackson	Booth and Co.
30	Delta	,,	J. H. Stephens	Smith and Hill.
31	Gamma	,,	W. S. Mason	
32	Adriatic	,,	H. H. Perry	
33	Baltic	,,	C. W. Kennedy	
34	Celtic	,,	W. H. Thompson	Ismay, Imrie, and Co.
35	Gaelic	,,	B. Gleadell and J. W. Jennings	
36	Oceanic	,,	W. W. Kiddle, R. N.	
37	Republic	,,	B. Gleadell	
39	Mississippi	,,	J. Roberts	Mississippi & Dominion S.S. Co.
40	Annie Laurie	Sailing	?	Thomson and Co.
41	American	S. S.	Wm. Ladds, R.N.R.	Union Steam Ship Co.
42	Asiatic	,,	C. D. Coxwell	
43	Danube	,,	H. J. G. S. Warleigh, R.N.R.	
44	Northam	,,	H. E. Draper	
45	Syria	,,	Wm. Ladds, R.N.R, and A. J. Garrett	

Ship's Number on the Charts.	Ship's Name, &c.		Captain's Name.	Lender of the Data.
46	Salisbury	Sailing	J. C. Clare	The Merchant Shipping Co.
47	Star of India	„	C. Holloway	
48	Boyne	S. S.	F. Reeks	
49	Douro	„	J. Thwaites	
50	Elbe	„	J. T. Moir	
51	Ebro	„	G. E. Parkes	Royal Mail Steam Packet Co.
52	Liffey	„	Wm. Gillies	
53	Nile	„	R. Rivett	
54	Arno	„	S. Dix	
55	Abyssinia	„	W. H. P. Hains	
56	Algeria	„	F. Le Messurier	
57	Atlas	„	W. Gill	
59	Calabria	„	W. M'Mickan	
60	Cuba	„	E. R. Moodie	British and North American R. M. Steam Packet Co.
61	Hecla	„	M. Murphy	
63	Olympus	„	R. M'Dowall	
65	Russia	„	F. Cook	
66	Scotia	„	E. G. Lott	
67	Siberia	„	J. Harrison	
68	Canadian	„	W. Richardson	Montreal Ocean Steam Ship Co. (Liverpool Branch).
69	Circassian	„	J. Wylie	
70	Prussian	„	J. E. Dutton, R.N.R.	
71	Sarmatian	„	A. D. Aird	
73	Corinthian	„	J. Scott	Do. (Glasgow Branch).
74	Phœnician	„	E. Scott	
75	Great Western	„	W. Stamper	M. Whitwell.
76	Cuban	„	S. S. Sandrey	West India and Pacific Steam Ship Co.
77	Jamaica	„	R. Watson	
78	Venezuelan	„	A. W. Bremner	
80	Roseneath	Sailing	—— Curr	Ross and Co.
82	Chusan	„	J. W. Roy	British and Eastern Shipping Co.
84	Rydall Hall	S. S.	R. Collin	R. Alexander.
86	Josephine	Sailing	J. M'Donald	Gregor, Turnbull, and Co.
87	Maipu	„	G. Randall	Brooke and Worthington.
88	Atlantic	„	?	Anderson, Anderson, and Co.
89	Cosmopolite	„	?	
92	Gloriana	„	T. Peregrine	J. Wilson.
93	City of Antwerp	S. S.	J. Delamotte and G. S. Murray	Inman and Co.
94	City of Brussels	„	R. Leitch	
95	City of Bristol	„	J. Ellison	
96	City of Brooklyn	„	T. C. Jones	
97	City of Chester	„	J. Kennedy	
98	City of Limerick	„	W. Jamieson	
99	City of London	„	J. Eynon	
00	City of Montreal	„	J. Mirehouse	
101	City of New York	„	G. Lochead	
102	City of Paris	„	H. Tibbits	
103	Queen of the Clyde	Sailing	—— Duncan	J. and A. Roxburgh.
104	Clydesdale	„	J. Gilkison	
105	Albert the Good	„	—— Boalt	R. B. Porrett.
108	Jessie Boyle		?	Moore and Rawle.
109	Corsair	„	E. La Marque	Deputron and Rooth.
110	Empress	„	E. J. Hamon	Houlder Bros. and Co.
113	Biafra	S. S.	R. Stone	African Steam Ship Co.

Ship's Number on the Charts.	Ship's Name, &c.		Captain's Name.	Lender of the Data.
115	Hound	Sailing	—— Carroll	
116	Arthur	,,	C. W. Carty	
117	Robert Mowe	,,	?	
118	M. S. Lunt	,,	F. J. Simmons	
121	W. A. Gibson	,,	?	General Sir J. H. Lefroy,* K.C.M.G., Governor of Bermuda, & F. H. Jahncke, Esq.,* of St. Thomas.
123	Georgetta Lawrence	,,	—— Robinson	
126	Excelsior	,,	?	
127	Mary Baker	,,	—— Thompson	
128	Albemarle	S. S.	A. W. Stark	
129	Queen of the South	Sailing	J. Adair	
130	Worcester (United States Frigate)		—	
131	Copernicus	S. S.	J. Hudson	
132	Humboldt	,,	R. Yaxley	
133	Lalande	,,	O. Williams	Lamport and Holt.
134	Leibnitz	,,	E. Hairby	
135	Newton	,,	H. S. Ferguson	
136	Warrior	,,	M. L. Campbell	
139	Sparkenhoe	Sailing	J. Popham	E. Berry.
142	Louisa	,,	R. G. Pomeroy	Daniel and Co.
144	North Tyne	S. S.	A. Wardlaw	W. Dickinson.
145	Glennevis	Sailing	W. Cumming	N. Cameron.
146	Arran	,,	R. Stirling	Hendry, Ferguson, and Co.
148	Annie Ainslie	S. S.	D. Corkery	Nelson, Donkin, and Co.
149	Norton	Sailing	T. Davis	Dixon and Sons.
156	Charlotte Gladstone	,,	I. Paddle	Shaw, Saville, and Co.
151	Bonny	S. S.	C. Hamilton	
152	Congo	,,	E. Griffiths	
153	Liberia	,,	R. F. Lowry	
154	Loanda	,,	W. S. Folland	British and African Steam Navigation Co.
155	Roquelle	,,	J. Sullivan	
156	Senegal	,,	J. Griffiths	
157	Volta	,,	A. P. French	
158	Cecilia	Sailing	S. Furze	Nelson and Co.
159	Lapland	S. S.	E. Jones	Donald, Currie, and Co.
162	Helen	Sailing	J. S. Legoe	Thomson, Hanley, and Co.
164	Crosby	S. S.	J. Hayes	T. and W. Smith.
166	Cambrian	Sailing	?	Lucas, Brothers, and Co.
167	Glengaber	,,	J. B. Gray	Johnston, Churchill, and Co.
168	The Crags	,,	W. Hegrum	R. Cuthbert.
169	Texas	S. S.	F. B. Bouchette	Mississippi and Dominion Steam Ship Co.
171	Casket	Sailing	T. Falla	Deputron and Rooth.
172	Necra	S. S.	C. C. Coburn	Tod, Kennard, and Co.
173	Speranza	Sailing	J. McD. Gray	
174	Hong Kong	S. S.	W. Symington	
175	Gitana	Sailing	E. J. Blake	
177	Nelly	,,	Chas. Harland	
178	Sentinel	S. S.	J. W. Newton	Captain (observing for the Meteorological Office with standard instruments).
	Grenadier	,,		
179	Palmyra	Sailing	S. C. Burton	
180	Niger	S. S.	G. H. Jones	
181	Fedalma	Sailing	J. T. Hamlyn	
182	Strathclyde	S. S.	C. W. Pearson	

* Sir J. H. Lefroy and Mr. F. H. Jahncke not only collected but worked at the data, and supplied their work to this Office.

Ship's Number on the Charts.	Ship's Name, &c.		Captain's Name.		Lender of the Data.
183	Sorata	Sailing	J. J. Price	"	
184	Mazinthien	S. S.	J. Walker	"	
185	Carn Tual	Sailing	W. Pirrie	"	
186	Bowfell	"	W. Ellery	"	
187	Rozelle	"	E. C. W. Heggum	"	
188	Vere	"	T. L. Wadham	"	
189	Delta	S. S.	G. Shaw	"	
190	Batavia	"	J. E. Mouland	"	
191	Yorkshire	"	J. B. Kennedy, R.N.R.	"	
192	Scandinavian	"	W. H. Smith, R.N.R.	"	
193	Prince of Wales	Sailing	W. A. Crombie	"	
194	Traveller	"	A. Simpson	"	
195	Java	S. S.	J. A. Martyn	"	
196	Parthia	"	W. Watson	"	
197	Strathearn	Sailing	E. E. Brett	"	Captain (observing for the Meteorological Office with standard instruments).
198	Hong Kong	S. S.	W. Symington	"	
199	Decapolis	Sailing	T. M. Almond	"	
200	Wisconsin	S. S.	T. W. Freeman	"	
201	St. Lawrence	Sailing	C. Johnson, R.N.R.	"	
202	Baroda	"	T. Tully	"	
203	Misero	"	G. Carruthers	"	
204	City of Perth	"	Alex. Beckett	"	
205	Otago	"	G. Stuart	"	
206	Eleanor	"	C. C. Prelan	"	
208	Mervyn	"	T. E. Hassell	"	
209	Medea	"	E. C. Bennett	"	
210	Gulnare	H. M. Hired Ship	W. F. Maxwell, R.N.	"	
212	John Allan	Sailing	James Horne	"	
213	South Australian	"	John Bruce	"	
215	Chevy Chase	"	S. J. Thompson	"	
216	Challenger	H. M. S.	Sir G. S. Nares, K.C.B., F.R.S., R.N.		
221	Ariadne	"	Hon. W. C. Carpenter	"	
224	Pert	"	C. G. Jones	"	
225	Adventure	"	Hon. A. D. S. Denison	"	
227	Sirius	"	D. Miller	"	
228	Royal Alfred	"	H. F. Nicholson	"	
231	Aurora	"	S. Douglas	"	
232	Pheasant	"	G. W. Allen	"	
233	Rattlesnake	"	Sir J. E. Commerell, K.C.B.	"	
234	Plover*	"	H. N. Hippisley	"	
236	Black Prince	"	C. L. Waddilove	"	The Admiralty.
237	Audacious	"	C. W. Hope	"	
238	Hercules	"	W. M. Dowell, C.B.	"	
239	Amethyst	"	F. R. Purvis	"	
240	Dana	"	W. S. Brown	"	
242	Endymion	"	E. Madden	"	
243	Swallow	"	J. Liddell	"	
244	Argus	"	P. P. Luxmoore, C.B.	"	
245	Niobe	"	Sir L. Loraine, Bt.	"	
247	Topaze	"	E. Hardinge, C.B.	"	

* Mr. J. R. H. MacFarlane, Navigating Sub-Lieutenant of the "Plover," collected various data which he sent to the Meteorological Office. This formed the ground-work of a paper which appeared in the Journal of the Meteorological Society for January 1874.

Ship's Number on the Charts.	Ship's Name, &c.		Captain's Name.		Lender of the Data.
248	Spartan	H. M. S.	J. S. Hudson	R.N.	
250	Aboukir	,,	A. F. R. De Horsey	,,	
253	Decoy	,,	John Hext	,,	
254	Merlin	,,	E. F. Day	,,	
255	Spiteful	,,	M. B. Medlycott	,,	
256	Sultan	,,	A. H. Hoskins, C.B.	,,	
257	Druid	,,	W. H. Blake	,,	
258	Agincourt	,,	R. O'B. Fitzroy	,,	
259	Doris	,,	W. H. Edye	,,	
260	Bittern	,,	P. W. Stephens	,,	
261	Ariel	,,	O. Churchill	,,	
262	Barracouta	,,	Hon. E. R. Fremantle, C.B., C.M.G.	,,	The Admiralty.
263	Seagull	,,	E. A. T. Stubbs	,,	
265	Devastation	,,	Sir W.N.W.Hewett,K.C.B.	,,	
266	Cherub	,,	F. C. R. Baker	,,	
267	Sphinx	,,	T. Barnardiston	,,	
268	Woodlark	,,	W. Howorth	,,	
269	Narcissus	,,	J. O. Hopkins	,,	
270	Achilles	,,	R. V. Hamilton, C.B.	,,	
271	Golden Gate	Sailing	T. Swinton	-	Cotesworth, Lyne, and Co.
272	Norseman	,,	J. Hellam	-	
273	Jason	,,	J. Jameson	-	J. H. Carmichael and Co.
274	Salado	,,	J. Johnston	-	
275	Ravensworth Castle	S. S.	W. Sergent	-	Northumberland Steam Shipping Co.
276	City of Lucknow	Sailing	W. Watson	-	G. Smith and Sons.
278	Perseverance	S. S.	Alexr. Murray	-	Captain (observing for the Meteorological Office with standard instruments).
279	Richmond	Sailing	W. H. Stuart	-	
280	Kielder Castle	S. S.	D. M. Tucker	-	Northumberland Steam Shipping Co.
281	Montreal	Sailing	James Adams	-	Livingstone, Brothers, and Co.
282	Nicoline	,,	A. J. Heim	-	
283	W. von Freeden	,,	R. Meyer	-	
284	Minerva	,,	Wendt	-	
285	Borrussia	S. S.	Schmidt	-	Dr. Neumayer, Deutsche Seewarte.
286	Frankfurt	,,	Von Bulow	-	
287	Graf Bismark	,,	G. Meyer	-	
288	Seenymphe	,,	G. Held	-	
289	Regent		?		Dépôt des Cartes et Plans, Paris.
290	Torbin		?		
292	Petrel		?		
293	Venus		?		

Daily List of Data according to the Numbers of the Logs.

AUGUST 1, 1878.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather. *	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
2	47 18 N.	15 15 W.	—	68	—	o	—
4	50 10	42 17	30·23	—	—	m	Heavy S.Wly.
5	51 9	42 55	30·31	52	56	m'	—
6	46 45	52 10	? 30·09	—	—	f	Smooth.
8	37 38	12 10	? 30·18	72	69	fine	—
9	41 34	65 13	29·95	—	—	f	—
10	55 24	12 36	—	—	—	c	—
23	50 43	61 14	—	—	—	fine and clear	—
24	48 49	5 8	30·20	65	—	fine	—
27	46 37	59 45	—	64	—	clear	—
28	12 33	37 31	—	—	—	fine	—
33	42 12	59 58	30·03	69	67	f	—
34	51 35	8 33	30·22	59	—	fine	—
35	48 58	39 29	30·25	57	56	c	Smooth.
40	55 9	21 52	—	—	—	m	—
43	20 0	17 17	29·90	—	—	b c m	Nly.
45	45 5	8 20	30·34	73	—	b c	Moderate Wly. swell.
47	14 30	21 9	—	79	—	fine	—
48	4 11	30 12	—	—	—	—	—
52	27 10	17 4	30·06	—	—	c	N.Ely.
53	14 49	61 33	—	—	—	—	—
54	15 11	61 22	—	—	—	c p	—
69	55 11	7 3	30·09	—	—	c	—
71	49 10	61 17	30·18	59	53	c	—
74	55 28	38 37	? 29·88	54	51	—	Wly.
76	10 26	75 34	—	—	—	fine	—
77	18 5	75 45	? 30·00	86	—	fine	—
78	23 55	82 35	30·22	81	—	fine	—
84	45 8	36 46	—	68	—	c	—
86	26 14	68 0	—	—	—	—	—

* Beaufort's Notation of Weather:—

b Blue sky.
c Clouds (detached).
d Drizzling rain.
f Foggy.
g Gloomy.
h Hail.
l Lightning.
m Misty (hazy).
o Overcast.
p Passing showers.
q Squally.
r Rain.
s Snow.
t Thunder.
u Ugly (threatening) appearance of weather.
v Visibility. Objects at a distance unusually visible.
w Dew.

Dashes under any letter mean increased intensity, thus r means heavy rain, r very heavy rain, &c.

An apostrophe (') above any letter means slight, thus r' means slight rain, &c.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
88	Belize, Honduras.		—	—	—	q r	—
93	40 31 N.	69 22 W.	30·11	73	64	f	—
102	42 7	58 13	—	—	—	m	—
103	53 49	16 9	—	—	—	c	—
105	52 16	48 16	—	—	—	clear	—
108	47 7	29 6	—	—	—	clear	—
109	27 12	61 11	—	—	—	—	—
110	6 4	31 29	—	82	—	q	—
113	4 55	7 59	—	—	—	c	—
139	45 51	12 40	—	—	—	fine	—
144	49 30	65 20	—	—	—	m	—
145	46 19	56 53	—	—	—	clear	—
146	51 33	31 20	—	—	—	r	—
149	50 0	34 27	—	—	—	c	Heavy W.N.Wly.
151	4 19	8 5 E.	—	—	—	q r	—
152	10 55	17 2 W.	—	—	—	c	—
153	5 42	4 54 E.	—	—	—	q r	—
154	8 36	13 33 W.	—	—	—	p	—
155	5 39	5 0 E.	—	—	—	fine and clear	Heavy confused.
157	42 49	12 58 W.	—	—	—	fine	—
158	31 16	20 13	—	—	—	c	—
164	46 58	49 5	3 P.M. 30·26	61	—	f r	—
166	6 49	22 52	—	—	—	r	—
167	42 54	14 54	—	—	—	m	—
168	54 30	16 7	—	—	—	clear	—
171	12 46	53 51	—	—	—	q l	—
173	42 5	29 18	30·50	69	68	b c	Long N.N.Wly. swell.
175	36 37	38 24	30·38	76	75	c b	Smooth.
177	41 16	42 53	30·39	74	71	b c	E.S.Ely.
178	Newcastle, England		29·97	65	62	c	—
179	8 14	25 34	29·98	76	78	c q r	Smooth.
181	19 9	59 59	30·11	84	82	c	Moderate.
184	74 0	11 0	29·55	33	34	o f	Smooth.
185	13 22	29 33	29·98	80	79	c p	N.N.Ely. swell.
187	10 52	35 40	29·99	82	82	b	Nly. swell.
188	16 47	64 43	30·12	83	82	b	—
190	45 36	38 16	30·51	68	65	c b	Calm.
192	56 4	26 51	29·95	56	56	f m	—
194	59 55	37 42	29·47	49	49	q o m	Heavy W.S.W.
199	2 36	18 0	30·01	79	76	c b	Smooth.
201	4 44	16 55	29·92	79	80	c g	Moderate S.E. swell.
202	29 53	22 14	30·23	75	73	b c	Moderate N.E.
203	35 4	17 31	30·25	75	74	b c	Light Ely.
204	29 50	19 50	30·20	73	71	c	Smooth.
205	35 41	14 46	30·21	75	71	b c v	Moderate W.N.W. swell.
206	35 48	5 53	30·05	74	72	b	Smooth.
209	40 2	14 12	30·32	70	70	b c	Heavy N.W. swell.
210	53 50	56 25	30·09	63	49	b	—
212	5 28	17 28	29·97	81	80	o q	Moderate.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
213	31 19 N.	18 47 W.	30·20	73	72	b c	Smooth.
216	Porto Grande, St. Vincent		29·97	78	—	c h	—
221	50 46	1 18	30·13	67	—	b c	—
224	7 50	25 0	29·95	75	80	o r	—
227	47 37	58 18	30·18	60	59	b c	—
228	Halifax, N. S.		30·13	64	—	c f d	—
231	40 11	23 8	30·39	67	—	o c p	—
232	Malaga, S. Spain		—	—	—	b m	—
233	Cape Coast Castle, W. C. Africa		30·03	77	—	b c	*See* 244, 254, and 257.
234	Port Royal, Jamaica		30·02	81	—	b c	*See* 243, 250, and 267.
238	53 33	0 43 E.	30·03	63	—	b c	*See* 256 and 258.
240	Barbadoes		30·03	82	—	b c p	—
243	Port Royal, Jamaica		30·03	80	—	b c	—
244	Cape Coast Castle, W. C. Africa		30·06	78	—	b c	—
245	16 15	86 35 W.	29·99	82	—	b c	—
247	40 2	23 11	30·41	67	—	o c p q	—
248	45 27	61 6	30·20	64	—	b c	—
250	Port Royal, Jamaica		29·96	79	—	b c	—
254	Cape Coast Castle, W. C. Africa		30·08	78	—	b c	—
256	53 33	0 50 E.	30·05	62	—	c	—
257	Cape Coast Castle, W. C. Africa		30·03	75	—	b c	—
258	53 37	0 49 E.	30·00	62	—	b c	—
259	40 2	23 10 W.	30·43	69	72	o c p	—
263	5 36	0 45 E.	29·98	79	—	b c	—
266	Charlotte Town, Prince Edw. I.		—	66	—	b c	—
267	Port Royal, Jamaica		30·03	82	—	b c	—
268	St. Barbe Hr., Str. Belle Isle		30·18	60	—	b c	—
269	40 4	23 12 W.	30·34	70	72	o c r	—
274	20 49	31 6	—	—	—	c	—
276	36 10	73 40	—	—	—	fine	Smooth.
278	39 45	34 0	29·67	52	52	g	Heavy W.S.W.
279	25 45	78 36	30·19	84	84	b c	Smooth.
281	49 30	13 50	—	—	—	clear	—
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·90	81	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·88	84	—	N.W. 2	—
2 P.M.			29·86	85	—	W. 4	—

AUGUST 2, 1873.

2	48 10 N.	12 0 W.	—	—	—	fine	—
4	48 28	48 30	30·11	—	—	f	—
5	52 40	36 11	30·34	54	52	clear and fine	—
6	44 48	56 29	? 29·88	—	—	p f	Smooth.
8	38 19	14 53	? 30·24	70	69	clear	—
9	43 11	60 18	30·01	—	—	f	—
10	55 9	18 22	—	—	—	clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
23	29 32 N.	64 50 W.	—	—	—	clear	—
24	45 24	8 0	30·29	68	—	o	—
27	47 34	60 30	—	—	—	clear	—
28	9 55	39 43	—	—	—	fine	—
33	40 56	67 4	29·96	66	66	f	—
34	51 22	16 7	30·28	61	63	clear	High Wly.
35	50 12	32 6	30·34	61	58	m d	Smooth.
39	55 39	11 29	—	—	—	m d	—
40	56 17	23 19	—	—	—	c	—
43	22 49	17 11	29·94	—	—	c m	High N.N.Ely.
45	48 27	5 52	30·35	69	—	b c	—
47	14 56	20 42	—	82	—	fine	—
48	8 26	28 16	29·92	—	—	c	—
52	23 40	19 57	30·05	—	—	c	N.Ely.
53	18 15	64 54	30·06	—	—	b c	—
54	16 57	62 37	—	—	—	fine	—
69	55 48	12 27	29·98	59	58	m c p	—
71	49 0	68 0	29·96	54	56	f	—
74	54 51	43 6	? 29·91	53	51	fine	—
76	11 59	75 29	—	—	—	c	Heavy.
78	27 5	79 35	30·14	80	—	fine	—
84	45 54	31 0	—	70	—	c	—
86	27 16	67 23	—	—	—	fine	—
88	Belize, Honduras		—	—	—	q r	—
93	40 56	63 14	30·05	77	74	c	—
99	51 18	13 48	30·22	64	64	clear	—
102	41 25	65 12	—	—	—	clear	—
103	55 58	16 57	—	—	—	clear	—
104	51 40	55 50	—	—	—	r	—
105	51 5	49 13	—	—	—	m	—
108	48 18	32 3	—	—	—	r	—
109	28 34	61 7	—	—	—	fine	—
110	7 15	30 0	—	84	—	clear	—
113	4 31	6 58	—	—	—	c	—
139	43 47	13 45	—	—	—	fine	—
144	48 24	68 54	—	—	—	f	—
145	46 52	58 0	—	—	—	m	—
146	51 53	34 0	—	—	—	clear	—
149	50 35	33 10	—	—	—	g	—
152	9 2	14 3	—	—	—	q r	—
153	4 15	6 46 E.	—	—	—	c p	—
154	10 31	16 53 W.	—	—	—	c	—
157	46 8	10 50	—	—	—	c	—
158	29 32	21 46	—	—	—	c	—
161	13 40	61 45	—	—	—	q r	Heavy swell.
164	46 39	53 7	3·30 P.M. 30·01	— 61	—	m p	—
166	9 8	22 54	—	—	—	fine	—
167	40 49	16 35	—	—	—	clear	—
168	55 49	18 5	—	—	—	q p	—
171	13 29	60 19	—	—	—	fine	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
173	42 46 N.	29 16 W.	30·51	70	68	e b	Smooth.
175	37 43	38 22	30·42	74	75	e b	—
177	42 36	40 26	30·45	73	69	b c	Smooth.
179	8 51	25 38	29·97	78	79	b c	S.S.W. & N.N.E. seas.
181	21 55	60 22	30·15	84	82	b	Smooth.
184	74 10	10 0	29·46	37	35	o f	Smooth.
185	14 49	30 56	30·00	79	78	e p	N.N.E. swell.
187	12 2	38 9	29·95	80	79	b e p	—
188	17 9	67 38	30·10	84	83	b m	—
190	47 4	31 50	30·48	66	66	b	Calm.
192	56 2	18 32	30·00	59	57	e g	Moderate W.N.W.
194	59 16	36 30	29·51	49	49	e q	Heavy W.S.W.
199	1 25	21 3	30·02	79	75	c m	N.E.
201	4 32	14 12	29·93	79	81	e	Heavy.
202	27 37	23 52	30·17	73	73	b c	Moderate N.E.
203	32 38	19 14	30·19	74	73	e b	Heavy Ely.
204	25 50	21 8	30·09	73	72	e	Slight N.E.
205	33 5	17 2	30·16	75	73	b m	Short N.N.E.
206	36 4	4 55	30·04	74	72	f	Calm.
209	37 17	16 24	30·26	72	72	b e	—
210	53 55	56 35	29·87	61	50	e	—
212	5 20	19 18	29·97	81	80	o	Moderate.
213	28 41	20 55	30·13	73	72	o	—
216	St. Vincent		29·96	79	—	c m	—
224	9 10	24 44	29·91	80	80	b c	—
227	47 26	57 43	29·92	57	56	e	—
228	Halifax, N.S.		29·88	69	—	e	—
231	38 48	21 22	30·54	71	—	e p	—
232	Gibraltar		—	81	—	b c	—
233	Cape Coast Castle, W.C. Africa		30·04	79	—	b c	*See* 244, 254, and 257.
234	Port Royal, Jamaica		30·07	81	—	b e	*See* 243, 250, and 267.
240	Barbadoes		30·04	82	—	b c	—
243	Port Royal, Jamaica		30·03	79	—	b e	—
244	Cape Coast Castle, W.C. Africa		30·04	81	—	b c	—
245	Truxillo, Honduras		29·99	81	—	b c	—
247	38 48	21 28	30·42	70	71	b e q	—
248	44 30	62 41	29·89	63	—	o f	—
250	Port Royal, Jamaica		30·00	80	—	b c	—
254	Cape Coast Castle, W.C. Africa		30·08	81	—	b e	—
257	Cape Coast Castle, W.C. Africa		30·03	76	—	b e	—
259	38 58	21 32	30·38	70	71	b e	—
263	Quittah, W.C. Africa		29·99	80	—	b e	—
266	Charlotte Town, Prince Edw. I.		—	67	—	e p	—
267	Port Royal, Jamaica		30·03	83	—	b e	—
268	Blanc Sablon, Str. Belle Isle		29·97	64	—	e r	—
269	38 49	21 34	30·33	70	70	e q	—
274	23 12	33 0	—	—	—	o	—
276	38 50	74 3	—	—	—	clear	—
278	60 10	33 40	29·43	52	52	g	Heavy S.Wly.
279	25 48	78 6	30·12	81	85	e b	Smooth.
281	48 0	15 20	—	—	—	e	—
283	26 25	69 34	30·16	84	82	b e	Calm.
286	10 50	78 15	29·93	83	82	b	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
288	2 40 N.	47 30 W.	—	80	82	b	—
292	Gorree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·98	82	—	—	—
						Wind. Dir°. Force.	
11 A.M.	St. Louis, Senegal		29·90	84	—	W. 4	—
2 P.M.			29·83	84	—	W. 4	—

AUGUST 3, 1873.

2	49	23 N.	8	19 W.	—	—	—	fine	—
3	50	42	0	22	30·15	66	—	fine and clear	—
4	45	55	54	6	29·98	—	—	f	—
5	54	2	29	19	30·15	58	55	f	Heavy N.W.
6	42	49	60	42	? 29·77	—	—	f	Smooth
8	38	55	17	54	? 30·26	70	—	c	—
9	45	11	55	11	29·93	—	—	f	—
10	54	54	23	4	—	—	—	c	High.
11	40	30	69	6	—	71	—	m p	—
23	28	22	68	36	—	—	—	fine and clear	—
24	41	52	9	49	30·01	69	—	fine	—
27	48	34	62	56	—	66	—	c	—
28	7	11	41	45	—	—	—	c	—
32	40	41	68	35	29·90	69	66	—	—
33	40	32	73	18	29·90	74	—	clear	—
34	51	4	24	8	30·07	63	60	o	High Wly.
35	50	57	24	34	30·23	60	59	c	—
39	56	8	16	22	—	—	—	q	Heavy Wly.
40	57	36	24	0	—	—	—	p	—
43	25	41	16	39	29·91	—	—	b c m	N.N.Ely.
47	16	0	20	19	—	78	—	fine	—
48	12	44	26	38	29·93	—	—	o	—
52	20	13	22	36	29·98	—	—	c	—
53	17	41	68	16	30·05	—	—	b c	—
54	18	20	64	56	—	—	—	fine	—
66	51	47	8	15	30·15	76	76	fine	—
69	56	5	18	54	30·04	58	56	c	High.
70	49	16	66	23	? 29·62	61	—	c	—
74	53	37	48	54	? 29·71	54	52	m	—
76	15	3	76	3	—	—	—	c	Heavy swell.
78	30	20	78	40	30·08	85	—	fine	—
84	46	44	25	21	—	74	—	fine	—
86	28	0	66	54	—	—	—	p	—
93	41	16	57	14	30·05	76	76	fine and clear	Smooth.
96	40	39	69	12	29·90	72	70	f	—
99	50	55	20	43	30·13	54	62	c m	—
103	56	26	18	18	—	—	—	c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
104	51 40 N.	56 10 W.	—	—	—	c	—
105	51 9	50 49	—	—	—	c	—
108	49 33	35 30	—	—	—	f	—
109	28 59	62 19	—	—	—	fine	—
110	8 57	29 56	—	79	—	q	—
113	4 55	6 1	—	—	—	m	—
139	40 40	14 22	—	—	—	c	—
145	47 28	60 5	—	—	—	f	—
146	52 27	36 25	—	—	—	f	—
149	51 40	35 35	—	—	—	f	—
152	Sierra Leone, W. C. Africa		—	—	—	r	—
154	14 11	17 34	—	—	—	fine	—
158	26 45	23 15	—	—	—	c	—
161	16 2	62 0	—	—	—	fine	—
164	46 20	56 43	29·92	62	—	f	—
166	10 25	22 58	—	—	—	r	—
167	38 37	18 47	—	—	—	clear	—
171	Barbadoes		—	—	—	q p	—
173	43 8	29 25	30·51	75	69	b	Slight S.S.Ely. swell.
175	39 0	37 54	30·47	74	74	b	Very smooth.
177	43 22	37 28	30·49	75	68	b c	Smooth.
179	9 57	25 36	29·96	79	80	b c	S.S.W. & N.N.E. seas.
181	24 19	60 23	30·21	83	81	b	Smooth.
184	74 10	10 20	29·63	37	36	o f	Smooth.
185	16 21	32 26	30·03	80	77	c b	N.N.E. swell.
187	14 26	41 31	30·01	79	77	c m	—
188	17 30	70 32	30·12	83	82	c b m	—
190	48 38	24 45	30·36	65	62	c b	Calm.
192	55 38	9 24	30·07	59	58	b c p	Slight S.W.
194	58 0	35 34	29·74	50	50	c q	Long W.S.W. swell.
201	2 22	16 23	29·92	79	80	b c	Moderate.
202	24 42	25 31	30·09	75	73	b c	Moderate.
203	29 55	20 58	30·12	73	73	c	Moderate N.N.E.
204	22 30	22 8	29·98	74	73	c	Slight Nly.
205	30 25	19 0	30·07	75	72	b m	W.N.W. swell, short N.E. sea.
206	36 23	4 8	30·05	80	79	b m	Slight E.N.E. swell.
209	34 24	18 14	30·18	70	72	b c p	N.E. swell.
210	Curlew Harbour 53 45	56 30	29·76	65	53	c	—
212	8 23	21 15	29·96	81	79	b c	Regular.
213	25 19	22 23	30·01	74	73	o	Slight N.E.
216	St. Vincent		29·95	80	—	c m	—
224	9 48	24 0	29·98	78	80	o p	—
227	Ramea Island 47 33	57 30	29·82	57	56	o f r	—
228	Halifax, N.S.		29·87	69	—	b c	*See* 248.
231	38 6	19 45	30·26	70	—	b c	—
232	Gibraltar		—	74	—	o m	—
233	Cape Coast Castle, W.C. Africa		30·05	76	—	b c	*See* 244, 254, 257, & 262.
234	Port Royal, Jamaica		30·07	81	—	b c	*See* 243, 250, & 267.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
236	Great Nore		30·04	72	—	b c	—
237	In the Humber		29·93	72	—	b c	—
240	Barbadoes		30·00	79	—	b c p	—
243	Port Royal, Jamaica		30·02	84	—	b c	—
244	Cape Coast Castle, W. C. Africa		30·04	83	—	b c	—
245	Truxillo, Honduras		29·98	80	—	b c	—
247	38 5 N.	19 42 W.	30·25	72	74	o	—
248	Halifax, N.S.		29·87	67	—	c	—
250	Port Royal, Jamaica		30·00	80	—	c	—
254	Cape Coast Castle, W. C. Africa		30·08	80	—	b c	—
257	Cape Coast Castle, W. C. Africa		30·00	75	—	b c	—
259	38 8	19 45	30·31	71	72	b c	—
261	52 10	1 45	30·10	65	—	b c	—
262	Elmina, W. C. Africa		30·00	73	72	b c	—
263	Quittah, W. C. Africa		29·97	80	—	b c	—
266	Charlotte Town, Prince Edw. I.		—	66	—	b c	—
267	Port Royal, Jamaica		30·04	80	—	b c	—
268	Blanc Sablon, Str. Belle Isle		29·86	66	—	f	—
269	38 8	19 52	30·24	72	72	b c	—
274	25 25	34 48	—	—	—	clear	—
278	59 30	32 50	29·68	52	50	c g	Short S.W.
279	25 46	77 49	30·17	80	83	o	Smooth.
281	46 5	16 40	—	—	—	fine	—
283	28 21	68 27	30·21	85	82	b	—
286	11 0	75 15	29·86	84	82	o	High.
288	4 0	48 50	—	80	84	c	—
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W.C. Africa		29·94	84	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·91	83	—	N.W. 3	—
2 P.M.			29·89	74	—	S. 1	—

AUGUST 4, 1873.

3	50 30 N.	1 0 W.	30·10	63	—	fine and clear	—
4	43 19	58 36	29·95	—	—	f	—
5	54 50	21 59	30·05	59	57	clear and fine	—
6	41 44	65 13	—	—	—	p f	Smooth.
8	39 30	21 20	30·38	71	—	q	—
9	47 21	49 50	29·78	—	—	f	—
10	54 7	29 2	—	—	—	c	—
11	41 37	62 40	29·90	66	66	clear	—
23	27 13	72 19	—	—	—	fine	—
24	37 45	9 21	30·03	73	—	o	—
28	4 19	43 25	—	—	—	fine and clear	—
32	41 37	61 43	29·95	74	74	fine	—
34	50 23	30 53	30·07	61	60	m	Wly.
35	51 24	17 10	29·98	61	58	m	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
39	56 28 N.	22 8 W.	—	—	—	c	—
40	56 53	24 20	—	—	—	c	—
43	28 48	16 52	30·07	—	—	c m	N.Ely.
46	1 54	25 37	30·02	78	—	c	—
47	16 28	20 9	—	82	—	fine	—
53	18 9	72 32	30·08	—	—	b c	—
54	18 30	66 7	—	—	—	c	—
66	51 17	14 18	29·99	76	68	m	—
69	56 3	26 14	29·96	59	55	clear	—
70	49 48	59 54	? 29·85	51	52	o	—
74	52 5	55 0	? 29·67	47	48	r m	—
78	33 25	76 0	30·09	81	—	c	—
84	47 40	19 21	—	70	—	p	Heavy W.N.W.
86	28 35	66 33	—	—	—	—	—
88	Belize, Honduras		—	—	—	P	—
93	42 12	50 49	30·17	70	66	fine and clear	Confused swell.
96	41 3	62 47	29·96	78	78	p	—
99	50 13	36 29	30·00	62	61	c	Wly.
103	57 2	20 30	—	—	—	g	—
105	50 36	52 41	—	—	—	r	—
108	51 9	37 40	—	—	—	f	—
109	29 20	62 17	—	—	—	fine	—
110	10 5	30 0	—	79	—	r	—
113	Grand Bassam, W.C. Africa		—	—	—	m	—
139	37 48	15 52	—	—	—	c	—
145	48 45	61 55	—	—	—	c	—
146	52 36	37 42	—	—	—	f	—
149	52 16	36 20	—	—	—	f	Heavy swell.
154	18 5	17 38	—	—	—	m	N.N.E. swell.
155	5 55	1 5 E.	—	—	—	clear	—
158	24 12	24 21 W.	—	—	—	c	—
161	17 0	68 15	—	—	—	q	High N.N.Ely.
164	46 8	59 30	—	—	—	f	—
166	11 44	23 24	—	—	—	c	—
167	35 34	19 34	—	—	—	clear	—
168	56 54	21 5	—	—	—	clear	—
173	43 57	27 45	30·45	67	68	b c	Slight W.N.W. swell.
174	32 5	29 17 E.	29·80	87	79	b	—
175	40 8	36 54 W.	30·50	73	74	c b	—
177	44 0	35 22	30·50	74	68	b c	N.N.Ely.
179	11 22	26 12	29·97	74	80	b c p	S.S.W. and N.N.E. seas.
181	26 9	60 37	30·27	85	82	b	Smooth.
184	74 30	10 0	29·64	37	38	o f	Smooth.
185	18 8	34 6	30·03	78	76	b	N.E. swell.
187	16 57	45 3	30·08	79	78	o m	—
188	17 40	73 44	30·08	83	81	b	—
190	50 3	17 38	30·02	62	62	f	Rather rough N.N.W.
194	57 55	37 20	29·62	50	50	f	Smooth.
201	0 0	18 20	29·98	75	75	b	Smooth.
202	22 12	27 11	30·02	76	75	g	Nly. swell.
203	26 54	33 5	30·07	74	72	o	Moderate N.E.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
204	20 39 N.	22 46 W.	29·98	76	74	o	Slight N.
205	26 43	20 55	30·01	72	72	o m	Long N.N.E. swell.
206	35 51	3 34	30·04	82	80	b m	Smooth.
209	30 57	19 52	30·15	73	72	b c	—
210	Curlew Harbour		29·94	48	52	c	—
212	2 23	24 24	30·00	79	79	b c	Smooth.
213	22 32	23 36	29·98	76	74	o m	Slight N.E.
216	St. Vincent		29·96	83	—	c b	—
224	11 40	23 17	29·98	78	80	p c b	—
227	Rames Island		29·78	57	58	o f	—
228	47 33 "	57 30	29·83	67	—	f	*See* 248.
231	37 32	17 11	30·25	70	—	c q	—
232	Gibraltar		—	83	—	b c	—
233	Cape Coast Castle, W.C. Africa		30·04	76	—	b c m	*See* 244, 254, 257, & 262.
234	Port Royal, Jamaica		30·06	82	—	b c	*See* 243, 250, & 267.
236	The Nore		29·93	74	—	b c	*See* 237.
237	The Nore		29·84	73	—	b c	—
240	Barbadoes		29·98	81	—	b c q	—
242	37 16	17 10	30·22	70	72	c p q	—
243	Port Royal, Jamaica		30·04	81	—	b c	—
244	Cape Coast Castle, W.C. Africa		30·04	80	—	b c	—
245	Truxillo, Honduras		29·99	81	—	b c	—
247	37 16	17 7	30·21	70	71	b c q	—
248	Halifax, N.S.		29·90	70	—	b c	—
250	Port Royal, Jamaica		30·01	79	—	b c	—
254	Cape Coast Castle, W.C. Africa		30·07	81	—	b c	—
257	Cape Coast Castle, W.C. Africa		30·04	74	—	b c	—
259	37 14	17 4	30·25	71	71	b c	—
261	53 51	1 32 E.	30·02	58	—	o r	—
262	Elmina, W.C. Africa		30·00	78	74	b c	—
263	Lagos, W.C. Africa		29·97	79	—	b c	—
265	Portland, England		30·06	69	—	b c	—
266	Charlotte Town, Prince Edw. I.		—	67	—	b c	—
267	Port Royal, Jamaica		30·03	84	—	b c	—
268	Blanc Sablon, Ste. Belle Isle		29·89	54	—	o q r	—
269	37 27	17 12 W.	30·21	70	71	o q p	—
274	27 10	36 33	—	—	—	c	—
275	41 0	68 40	—	—	—	c	—
278	58 35	34 10	29·72	52	52	o m r	W.
279	25 29	77 41	30·10	83	83	b c	S.S.E.
280	53 55	4 52	—	—	—	fine	Heavy.
281	44 0	18 35	—	—	—	m	—
283	29 38	67 43	30·27	89	83	b	Calm.
288	50 30	50 15	—	84	82	b	Calm.
292	Gorse, W.C. Africa		—	82	—	—	—
293	Gaboon River, W.C. Africa		29·94	82	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·93	82	—	W. 1	—
2 P.M.			29·91	86	—	N.W. 2	—

AUGUST 5, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
2	50 23 N.	1 41 W.	—	—	—	o	—
4	41 29	64 10	30·12	—	—	c	—
5	55 10	13 50	29·88	57	57	o (p-d)	—
6	49 32	70 13	? 30·04	—	—	fine and clear	Smooth.
8	49 3	24 45	? 30·38	71	71	—	—
9	49 30	44 0	29·73	—	—	dull and heavy	—
10	53 3	33 59	—	—	—	m	—
11	43 22	56 29	—	54	54	c	—
23	26 13	75 51	—	—	—	—	—
24	35 56	5 41	30·03	73	—	fine	—
28	1 17	45 29	—	—	—	fine and clear	—
32	42 57	54 59	—	65	66	c	—
34	49 20	37 29	29·95	62	59	m	Confused.
35	51 26	9 42	30·00	60	59	fine	—
39	56 27	28 19	—	—	—	m	Heavy Wly.
40	56 59	26 18	—	—	—	r	—
42	0 12	11 14	—	—	—	fine	—
43	31 58	17 20	30·17	—	—	b c	Heavy N.N.Ely.
46	4 27	26 44	30·01	80	—	c	—
47	16 33	20 23	—	81	—	—	—
48	19 30	23 10	29·93	—	—	m	—
52	14 27	25 55	30·01	—	—	m	—
54	17 58	65 55	—	—	—	o	—
66	50 51	21 35	30·07	72	65	m	Rising.
69	55 47	34 7	29·72	52	52	—	Wly. (less sea).
70	52 5	54 10	? 30·08	51	50	fine and clear	—
74	49 34	60 23	? 29·93	52	56	clear	—
78	36 24	74 35	30·09	80	—	fine	—
84	48 34	13 29	—	66	—	c	—
86	29 1	66 27	—	—	—	sultry	—
87	0 19	33 22	—	—	—	m c	—
93	44 0	44 24	30·15	73	68	fine and clear	Smooth.
96	41 33	56 11	29·96	74	76	c	—
99	49 9	32 14	30·07	64	61	m	W.S.Wly.
103	57 22	22 36	—	—	—	m	—
105	47 25	52 24	—	—	—	fine	—
108	51 59	39 2	—	—	—	r	Heavy.
109	29 30	62 10	—	—	—	fine	—
110	10 35	30 7	—	78	—	o	—
136	2 23	30 27	—	—	—	clear	—
139	35 13	17 13	—	—	—	fine	—
145	49 10	62 45	—	—	—	clear	—
146	53 30	40 15	—	—	—	clear	—
149	53 22	35 57	—	—	—	clear	—
152	6 38	11 22	—	—	—	c	—
153	Bonny, W. C. Africa		—	—	—	c r	—
154	21 45	17 38	—	—	—	m	—
155	5 18	0 30	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
158	22 0 N.	25 4 W.	—	—	—	m	—
161	20 0	63 15	—	—	—	q	High.
164	Sydney, Cape Breton		—	—	—	g	—
166	13 15	24 15	—	—	—	fine	—
167	32 42	21 23	—	—	—	clear	—
168	57 58	23 6	—	—	—	p q	—
173	45 50	23 49	30·31	64	64	o d m	Short N.W.
174	33 3	25 26 E.	29·79	86	79	b	Moderate.
175	42 3	35 2 W.	30·44	73	70	e b	E. swell.
177	44 28	32 39	30·43	74	69	b c	Wly. swell.
179	12 33	56 53	29·98	79	81	b e	S.S.W. and N.N.E. seas.
181	27 13	61 20	30·25	87	82	b	Smooth.
184	74 30	10 30	29·57	32	36	o f	Smooth.
185	19 26	35 24	30·06	80	76	e b	N.E. swell.
187	19 20	48 18	30·10	77	78	b	N.Ely.
188	17 50	76 5	30·06	84	83	b m	—
194	57 29	38 10	29·58	48	49	e q	—
202	20 10	28 5	30·03	77	76	o	Nly. swell.
203	24 9	24 28	30·08	75	74	c	Moderate N.E.
204	19 42	23 13	30·01	77	74	o	Smooth.
205	24 27	22 6	30·04	76	75	o m	Long N.N.E. swell.
206	36 23	2 52	29·93	79	79	b e m	Very smooth.
209	27 13	21 39	30·10	73	72	b e m	Rather rough N.E. swell.
210	53 45	56 30	30·07	65	51	b	—
212	0 47	26 29	30·02	77	77	b e	Smooth.
213	20 54	24 35	30·02	76	75	o m	Smooth.
216	St. Vincent		30·01	82	—	e b m	—
224	13 13	22 53	30·04	78	80	b e p	—
227	47 25	57 0	30·06	51	54	o	—
228	Halifax, N.S.		30·18	59	—	b e	*See* 248.
231	37 0	13 22	30·11	70	—	b e q	—
232	Gibraltar		—	83	—	b e m	—
233	Cape Coast Castle, W. C. Africa		30·04	75	—	b e	*See* 244, 254, and 257.
234	Port Royal, Jamaica		30·06	81	—	b e	*See* 243, 250, and 267.
236	50 43	0 35 E.	29·90	63	—	b e	—
237	50 40	0 10	29·84	67	—	o q	—
240	Barbadoes		30·04	82	—	b c	—
242	37 0	13 29 W.	30·14	70	69	b e	—
243	Port Royal, Jamaica		30·04	82	—	b c	—
244	Cape Coast Castle, W. C. Africa		30·01	79	—	b e	—
245	Truxillo, Honduras		30·05	82	—	b e	—
247	37 15	13 24	30·16	68	70	b e	—
248	Halifax, N.S.		30·08	63	—	b e	—
250	Port Royal, Jamaica		30·00	80	—	b e	—
254	Cape Coast Castle, W. C. Africa		30·07	80	—	b e	—
257	Cape Coast Castle, W. C. Africa		29·95	73	—	b e	—
259	37 0	13 24	30·18	71	70	b e	—
261	Holy Island, N. E. Coast Eng.		30·23	62	—	b e	—
263	6 17	3 0 E.	29·96	79	—	b e	—
266	Charlotte Town, Prince Edw. I.		—	59	—	b e	—
267	Port Royal, Jamaica		30·04	86	—	b e	—
268	Blanc Sablon, Str. Belle Isle		29·93	49	—	f	—
269	37 2	13 32 W.	30·13	71	70	b e q	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
274	29 16 N.	37 32 W.	—	—	—	c	—
275	38 58	71 12	—	—	—	fine	—
278	58 15	34 55	29·52	51	50	c	Heavy W.N.W.
279	Nassau, New Providence		30·23	82	84	b c	Smooth.
280	51 16	6 7	—	—	—	c	Smooth.
281	42 15	21 10	—	—	—	c	—
283	30 27	67 17	30·27	85	82	b c	Calm.
288	6 50	51 4	—	84	85	b	High N.E.
292	Goree, W. C. Africa			84	—	—	—
293	Gaboon River, W. C. Africa		29·93	81	—	—	—
						Wind. Dir. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·96 29·89	82 86	— —	N.N.W. 1 N.N.W. 2	— —

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3	50 18 N.	1 52 W.	30·04	64	—	c	—
4	40 43	70 31	30·26	—	—	clear & pleasant	—
5	55 14	6 50	—	—	—	—	—
8	40 41	28 20	? 30·35	—	71	c	—
9	51 1	39 1	29·82	—	—	clear	—
10	51 45	39 39	—	—	—	c	—
11	45 37	30 59	—	53	53	c	—
23	26 0	79 20	—	—	—	fine	—
24	36 26	2 10	29·93	84	—	m	E.N.Ely.
32	44 27	48 22	29·93	56	56	c	—
34	47 40	44 24	29·86	54	53	c	—
39	56 8	33 20	—	—	—	c	Wly.
40	56 6	26 45	—	—	—	c	—
42	3 37	13 18	—	—	—	fine and clear	—
43	34 19	15 1	30·14	—	—	b c	Light Nly. swell.
44	49 15	4 34	30·12	—	—	c	—
46	6 42	27 7	29·96	80	—	c	—
47	17 14	22 1	—	80	—	fine	—
48	23 11	20 29	29·93	—	—	o	—
52	10 51	26 51	—	—	—	clear	—
53	Port Royal, Jamaica		30·08	—	—	—	See 234, 243, 250, and 267.
54	18 10	67 9	—	—	—	fine	—
55	51 49	8 15	—	61	58	c	—
66	49 54	27 28	30·07	70	66	—	High Wly.
69	54 56	41 21	29·82	51	51	c q	High Wly.
70	54 2	46 52	? 29·89	50	50	o p	—
74	49 19	65 48	? 29·97	58	59	fine	—
77	18 58	80 52	—	85	—	fine	—
84	49 31	7 35	—	70	—	m	—
86	29 11	66 21	—	—	—	o	—
87	2 44	33 54	—	—	—	g c	—
88	Belize, Honduras		—	—	—	sultry	—
93	46 14	37 27	29·98	68	68	fine and clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
96	43 5 N.	50 15 W.	29·96	56	55	m	N.N.E. swell.
99	47 51	37 8	29·78	64	62	o	High W.S.Wly.
101	51 55	7 10	—	—	—	clear	—
103	56 26	23 46	—	—	—	g	—
104	48 55	62 10	—	—	—	clear	Calm.
105	46 27	53 45	—	—	—	fine	—
108	50 3	41 14	—	—	—	c	—
109	30 0	61 26	—	—	—	c p	—
110	11 0	30 20	—	80	—	c	—
113	Accra, W. C. Africa		—	—	—	c	—
136	6 8	28 56	—	—	—	clear	—
139	33 27	17 20	—	—	—	clear	—
145	49 25	63 40	—	—	—	clear	—
146	52 0	42 28	—	—	—	clear	—
149	52 19	37 1	—	—	—	c	Heavy N.Wly. swell.
151	5 45	4 45 E.	—	—	—	p	—
152	5 10	9 20 W.	—	—	—	fine	—
154	24 51	16 33	—	—	—	m	Heavy N.N.Ely. swell.
155	4 54	1 30	—	—	—	c p	—
158	20 0	25 36	—	—	—	fine and clear	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	13 45	24 31	—	—	—	hot	—
167	30 2	22 40	—	—	—	clear	—
168	36 22	23 23	—	—	—	clear	—
173	47 21	20 48	30·26	66	65	c b	Strong N.W. swell.
174	44 15	21 15 E.	29·93	86	80	b	Smooth.
175	41 51	32 22 W.	30·35	71	71	c b m	Very smooth.
177	45 4	29 8	30·32	72	68	b c	W.N.Wly. swell.
179	13 12	26 44	29·95	81	81	b c	S.S.W. and N.N.E. seas.
181	27 43	62 26	30·11	85	82	b	Smooth.
184	74 49	11 0	29·54	36	37	o	Smooth.
185	20 29	36 3	30·04	76	76	c b p	N.N.E. swell.
187	19 56	51 10	30·02	78	79	b	N.Ely.
194	57 59	38 17	29·54	46	49	c q	Heavy Wly.
202	18 52	28 35	29·99	77	76	b c	Smooth.
203	21 54	25 30	30·03	74	74	m d	Moderate N.E.
204	18 48	24 32	29·99	77	75	b c	Smooth.
205	22 38	23 6	29·97	76	74	o m	Moderate N.N.E. swell.
206	35 34	1 44	29·93	79	80	c g m	Slight.
209	23 53	23 13	30·02	75	74	o m	N.N.E. swell.
210	53 50	56 25	30·07	60	—	b	—
213	19 27	25 23	30·01	76	76	b c m	Smooth.
216	15 48	24 18	29·96	80	78	c	Smooth.
224	14 47	23 55	29·96	80	80	o r	—
227	Despair Bay, N. F.		30·12	52	54	b c	—
228	Halifax, N. S.		30·20	60	—	b c	*See* 248.
231	36 59	10 35	30·08	71	—	b c	—
232	36 15	6 5	—	75	—	b c m	—
233	Cape Coast Castle, W. C. Africa		30·07	75	—	c r	*See* 244, 254, and 257.
234	Port Royal, Jamaica		30·08	80	—	b c	—
237	Spithead		29·75	67	—	b m	*See* 238, 256, and 258.
238	Spithead		30·06	69	—	b c	—
239	Keyham		—	—	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
240	Barbadoes		29·99	82	—	b c	—
242	36 50 N.	10 35 W.	30·03	70	69	b c	—
243	Port Royal, Jamaica		30·02	76	—	e p l	—
244	Cape Coast Castle, W. C. Africa		30·05	73	—	c r	—
245	Truxillo, Honduras		30·04	79	—	o r	—
247	36 49	10 36	30·07	69	71	b c	—
248	Halifax, N. S.		30·24	57	—	b c	—
250	Port Royal, Jamaica		30·03	76	—	r l t	—
254	Cape Coast Castle, W. C. Africa		30·07	80	—	o r	—
256	Spithead		30·03	71	—	b c	—
257	Cape Coast Castle, W. C. Africa		29·98	73	—	c p	—
258	Spithead		29·92	69	—	o c	—
259	36 51	10 27	30·01	71	70	b c	—
261	Holy Island, N.E. Coast England		29·72	63	—	b c	—
263	Lagos, W. C. Africa		29·95	81	—	b c	—
266	Georgetown, Prince Edw. I.		—	69	—	b c	—
267	Port Royal, Jamaica		30·06	74	—	c r l t	—
268	Forteau Bay, Str. Belle Isle		30·14	62	—	b c	—
269	36 51	10 37	30·02	71	69	o	—
274	31 30	37 34	—	—	—	q	—
275	37 13	74 30	—	—	—	fine	—
278	58 25	35 0	29·57	50	50	c b	Heavy N.W.
279	Nassau, New Providence		30·06	83	84	b c	—
280	48 20	7 16	30·00	—	—	fine	—
281	42 0	33 10	—	—	—	fine	—
285	31 42	65 44	30·08	83	81	c b	—
286	12 15	72 45	29·93	78	77	b	—
288	7 30	51 0	—	82	84	c r	High N.E.
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·95	82	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·86	84	—	N.N.W. 2	—
2 P.M.			29·79	86	—	N.N.W. 2	—

AUGUST 7, 1873.

3	50 2 N.	2 28 W.	30·16	68	—	f	—
8	41 1	31 58	? 30·36	72	72	fine	—
9	52 27	32 40	29·88	—	—	fine and clear	—
10	49 57	45 5	—	—	—	fine and clear	—
11	48 2	45 14	—	52	51	c	N.Ely.
23	24 15	82 25	—	—	—	q r	—
24	36 48	2 3 E.	29·96	80	—	fine	Long N.Ely. swell.
32	46 18	41 51 W.	30·08	60	63	c	E.N.Ely.
34	45 14	51 34	30·03	53	53	c	—
39	55 16	38 51	—	—	—	q	Wly.
40	55 59	28 6	—	—	—	p	—
42	6 57	15 3	—	—	—	fine	—
43	37 47	12 56	30·08	—	—	b c	Nly. swell.
44	46 5	7 3	30·19	—	—	b c f	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
46	9 24 N.	27 51 W.	29·96	78	—	p	—
47	18 16	23 55	—	74	—	c	—
48	26 20	17 52	29·94	—	—	c	N.Ely.
52	6 59	27 47	29·98	—	—	fine	—
53	13 30	77 49	29·96	—	—	b c	—
54	19 10	69 20	—	—	—	fine	—
55	51 13	14 11	30·06	62	60	o	Wly.
66	48 27	33 23	30·12	65	64	fine	—
69	53 28	48 29	30·13	52	53	fine and clear	Smooth.
70	55 30	38 33	? 29·88	52	50	p	—
73	55 30	9 41	29·82	62	—	g r	Heavy Wly.
74	East Traverse, River St. Lawrence		? 29·97	—	—	p	—
75	40 32	69 13	—	—	—	fine	—
76	18 45	74 20	—	—	—	pleasant	—
77	21 20	85 20	? 29·95	85	—	c	—
86	29 32	65 23	—	—	—	o	—
87	4 37	33 43	—	—	—	c	—
88	Belize, Honduras		—	—	—	sultry	—
93	48 14	30 30	30·03	61	62	c	Confused swell.
96	44 54	45 5	29·98	64	64	r	Heavy E.N.E.
99	45 49	42 47	30·08	64	65	c	—
101	51 11	12 40	? 30·23	62	62	m	Rising Wly. swell.
103	57 21	24 53	—	—	—	q	—
104	49 22	65 50	—	—	—	q	—
105	46 16	54 39	—	—	—	clear	—
108	48 22	44 58	—	—	—	fine	—
109	30 56	60 48	—	—	—	r l t	—
110	10 56	30 10	—	80	—	clear	—
113	6 10	1 40 E.	—	—	—	m	—
136	10 0	27 22 W.	—	—	—	p	—
139	31 49	16 41	—	—	—	fine	—
145	49 44	65 56	—	—	—	c p	—
146	50 40	44 5	—	—	—	fine	—
149	50 35	39 34	—	—	—	—	—
153	Bonny, W. C. Africa		—	—	—	clear	—
154	27 42 N.	16 15	—	—	—	m	Heavy Nly.
155	5 9	4 21	—	—	—	m	—
156	51 53	6 7 W.	—	—	—	m	—
158	18 3	25 58	—	—	—	c m	—
164	Sydney, C. Breton		—	—	—	fine	—
166	14 53	25 45	—	—	—	c	—
167	27 26	23 51	—	—	—	clear	—
168	57 35	25 26	—	—	—	q	—
173	48 16	18 25	30·22	66	65	b	Heavy W.N.W. swell.
174	35 28	16 52 E.	30·03	84	81	b	—
175	42 38	29 43 W.	30·32	71	69	b m	—
177	45 54	25 23	30·28	73	66	b	Heavy W.N.W. swell.
178	52 49	1 32 E.	30·08	72	65	o	—
179	13 49	28 4 W.	29·94	78	79	b c	N.N.E.
181	28 38	62 2	29·94	82	82	c b p	Smooth.
184	75 0	10 30	29·57	44	36	c	Smooth.
185	21 19	36 30	30·05	79	77	c b p	Heavy N.N.Ely. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
187	22 5 N.	52 39 W.	29·99	78	79	b	Ely.
194	59 6	38 32	29·68	45	48	c q	Moderate Wly.
195	40 14	70 17	30·16	69	68	b	Smooth.
202	17 8	29 12	29·98	78	77	b c	Smooth.
203	19 55	26 30	29·99	75	75	c	Moderate N.Ely.
204	16 51	25 48	29·95	75	75	o	Slight N.E.
205	20 0	24 32	29·94	77	75	m	Short N.N.E.
206	36 16	1 9	30·03	79	79	b c m	Rather rough.
209	21 2	24 37	29·97	76	75	o m	N.N.E. swell.
210	53 50	56 25	29·83	62	50	—	—
213	17 25	26 28	29·95	77	77	o d	Confused.
216	Porto Praya, C. Verd I.		29·89	80	78	o	—
224	15 21	24 2	29·92	78	78	b c	—
227	Despair Bay, N. F.		30·11	57	56	b c	—
228	Halifax, N. S.		30·06	62	—	b c	*See* 248.
231	36 35	8 26	—	—	—	b c	—
232	Gibraltar		—	81	—	o q	—
233	Cape Coast Castle, W. C. Africa		29·91	77	—	b c	*See* 244, 254, 257, & 262.
234	Port Royal, Jamaica		30·00	81	—	b c	*See* 243, 250, & 267.
236	Portland, England		30·11	70	—	b c	*See* 265.
240	Barbadoes		29·94	81	—	b c	—
242	36 35	8 33	30·02	70	—	b c	—
243	Port Royal, Jamaica		29·97	82	—	b c	—
244	Cape Coast Castle, W. C. Africa		30·02	81	—	b c	—
245	Truxillo, Honduras		29·96	80	—	b c	—
247	36 32	8 30	30·05	66	68	—	—
248	Halifax, N. S.		30·08	62	—	o	—
250	Port Royal, Jamaica		29·95	80	—	b c	—
254	Off Secondee, W. C. Africa		30·04	80	—	b c	—
257	Elmina, W. C. Africa		30·01	76	—	b c	—
259	36 35	8 24	30·02	71	67	b c	—
261	Holy Island, N. E. Coast, Eng.		29·89	65	—	b c	—
262	Elmina, W. C. Africa		29·97	77	72	b c	—
263	Lagos, W. C. Africa		29·96	82	—	b c	—
265	Portland, England		30·17	72	—	b c	—
266	45 10	61 0	—	62	60	b c	—
267	Port Royal, Jamaica		30·02	81	—	b c	—
268	Forteau Bay, Str. Belle Isle		30·03	57	—	c q	—
269	36 38	8 32	29·99	71	67	b c	—
274	33 27	36 50	—	—	—	q	—
278	59 10	34 40	29·65	50	49	c b	Short W.N.W.
279	Nassau, New Providence		30·09	83	83	b	Smooth.
280	45 19	8 36	30·11	—	—	fine	Heavy.
281	42 0	24 0	—	—	—	fine	—
283	32 1	63 30	29·97	79	79	o r	—
286	12 40	69 30	30·03	80	78	b	Short high.
288	8 10	41 10	—	84	84	b c	N.E.
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·90	84	—	—	—
						Wind. Dir. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·87 29·85	85 86	— —	S. 1 S.W. 3	— —

AUGUST 8, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	50 6 N.	3 1 W.	29·99	69	—	c	—
8	41 15	35 20	? 30·27	73	72	clear	—
9	53 37	26 7	29·93	—	—	fine and clear	—
10	47 46	50 36	—	—	—	c	—
11	50 45	38 33	—	54	55	o p	S.Ely.
23	26 12	85 42	—	—	—	—	—
24	37 26	6 12 E.	30·08	83	—	fine	Smooth.
26	48 36	4 45 W.	? 30·10	66	—	o	W.N.Wly. swell.
32	47 55	34 5	30·15	63	60	c	—
34	43 7	58 51	29·89	64	62	c r	W.S.Wly.
36	51 53	7 35	29·99	62	61	clear	—
39	53 53	44 29	—	—	—	m	Smooth.
40	54 45	29 20	—	—	—	c	—
42	10 14	16 54	—	—	—	fine	—
43	41 18	10 32	30·11	—	—	o	N.N.W. swell.
44	43 19	9 54	30·05	—	—	t l r	—
46	10 47	28 2	29·95	79	—	p	—
47	20 8	25 54	—	78	—	fine	—
48	29 19	15 22	29·97	—	—	—	Heavy N.N.Ely.
52	3 27	29 11	30·00	—	—	fine	—
53	9 50	79 43	29·92	—	—	b c	—
54	19 49	70 40	—	—	—	fine	—
55	50 40	21 20	30·19	—	—	c	Wly.
61	52 3	6 45	—	—	—	r	See 100.
66	46 12	40 43	29·87	76	72	f	—
69	51 37	56 2	29·76	52	50	—	—
70	56 13	30 3	? 30·11	59	52	c p	—
73	55 50	14 16	29·85	60	—	b c	Heavy Wly.
75	40 35	64 4	—	—	—	q r	—
76	18 34	72 21	—	—	—	clear	—
77	21 25	89 25	? 29·90	85	—	fine and clear	—
84	51 25	3 4 E.	—	73	—	fine	—
86	29 42	65 29 W.	—	—	—	p	—
87	5 41	33 12	—	—	—	c	—
93	49 49	24 8	30·32	59	60	—	Smooth.
96	46 34	39 20	29·96	64	65	c m	—
99	43 42	48 29	29·83	51	60	c	High W.S.Wly.
100	52 0	6 30	—	—	—	o r	—
101	51 1	18 53	? 30·22	59	59	fine	—
103	55 30	55 26	—	—	—	q r	—
104	49 15	67 30	—	—	—	clear	—
108	46 38	48 5	—	—	—	r	—
109	32 1	61 24	—	—	—	c	Heavy Nly.
110	11 14	29 20	—	79	—	o	—
136	13 27	26 20	—	—	—	dry	—
139	29 39	19 17	—	—	—	fine	—
145	49 35	67 0	—	—	—	p	—
146	49 11	46 20	—	—	—	f	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
149	49 29 N.	41 57 W.	—	—	—	bad	—
152	4 30	5 11	—	—	—	fine	—
154	28 37	16 5	—	—	—	c	Heavy Nly.
155	4 21	7 45	—	—	—	c m	—
156	48 22	9 34	—	—	—	fine	—
158	16 52	26 41	—	—	—	m	—
164	Sydney, Cape Breton		—	—	—	c m r	—
166	15 26	26 44	—	—	—	c	—
167	24 52	24 46	—	—	—	c	—
168	57 20	26 22	—	—	—	c	—
169	49 14	64 47	4 P.M. ? 29·83	64	—	c	—
173	49 26	14 52	30·16	60	63	o	Strong W.N.W. swell.
174	36 45	12 16 E.	30·07	87	80	b	Smooth.
175	43 3	27 44 W.	30·41	73	70	c b	—
177	46 22	23 14	30·29	64	65	o d	Wly. swell.
178	Newcastle, England		29·83	67	64	c	—
179	15 1	30 0	29·96	77	77	c	N.N.E.
180	54 6	1 26 E.	29·90	64	62	b c m	—
181	29 33	61 8 W.	29·99	81	82	b	N.W. swell.
184	74 45	11 30	29·53	35	38	b m	Light swell.
185	22 54	36 47	30·14	79	77	b c p	Moderate.
187	23 6	54 9	30·06	84	81	b	Ely.
194	59 51	39 39	29·93	47	48	b	Sharp short S.W. swell.
195	40 52	63 0	30·03	69	77	c	Smooth.
202	14 59	29 56	29·96	78	78	o	Nly. swell.
203	17 0	27 5	29·69	77	78	c	Light Ely.
204	13 55	26 36	29·97	79	78	c	Slight N.E.
205	17 16	25 46	29·96	76	76	p	Smooth.
206	36 22	0 7 E.	30·03	80	78	b	High short N.N.E. swell.
209	18 14	25 51 W.	29·98	75	75	b c	N.N.E. swell.
210	53 50	56 25	29·71	50	—	c	—
213	14 28	27 26	29·93	78	80	o d	Confused.
216	Porto Praya, C. Verd I.		29·95	81	—	o m	*See* 224.
224	Porto Praya, C. Verd I.		30·07	81	80	o	—
227	Despair Bay, N.F.		29·76	55	54	c f p	—
228	Halifax, N. S.		29·73	68	—	o	*See* 248.
231	35 54	6 0	30·04	76	—	b c m	—
233	Cape Coast Castle, W. C. Africa		30·02	83	—	b c m	*See* 244 and 262.
234	Port Royal, Jamaica		29·89	82	—	b c	*See* 245, 250, and 265.
236	Portland, England		29·92	72	—	b c	*See* 265.
237	50 32	1 50	29·83	73	—	b c	—
240	Barbadoes		29·92	81	—	b c	—
242	35 54	5 39	30·02	77	71	b c m	—
243	Port Royal, Jamaica		29·99	80	—	b c	—
244	Secondee, W. C. Africa		30·00	77	—	b c	—
245	Truxillo, Honduras		29·97	81	—	b c	—
247	35 55	5 46	30·03	73	61	b c m	—
248	Halifax, N. S.		29·78	65	—	b c	—
250	Port Royal, Jamaica		29·93	79	—	b c	—
254	Axim, W. C. Africa		30·03	81	—	b c	—
257	5 4	1 13	30·01	74	—	c m	—
259	35 55	5 40	30·04	76	67	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
262	Elmina, W. C. Africa		29·98	78	74	b c	—
263	Lagos, W. C. Africa		29·95	81	—	b c	—
265	Portland, England		30·02	71	—	b c	—
266	44 40 N.	63 0 W.	—	63	61	f	—
267	Port Royal, Jamaica		29·91	84	—	b c	—
268	Fortean Bay, Str. Belle Isle		—	—	—	o	—
269	35 56	5 45	29·99	77	68	b c m	—
274	35 7	35 42	—	—	—	g	—
278	58 35	35 10	30·07	51	50	b	Short N.W.
279	Nassau, New Providence		30·05	84	83	b	Smooth.
280	42 21	9 41	30·00	—	—	f	—
281	41 10	25 0	—	—	—	fine	—
288	9 40	51 55	—	85	84	b	—
292	Goree, W. C. Africa		—	82	—	—	—
293	Gaboon River, W. C. Africa		29·94	83	—	—	—
						Wind. Dir°. Force.	
	11 A.M. } St. Louis, Senegal { 2 P.M. }		29·92	83	—	W. 4	—
			29·91	82	—	S.W. 4	—

AUGUST 9, 1873.

3	48 58 N.	5 11 W.	30·21	62	—	clear	Heavy Wly.
8	41 28	38 49	? 30·28	73	72	c	—
9	54 32	18 52	29·96	—	—	clear & pleasant	—
10	46 2	53 45	—	—	—	f r	—
11	53 40	31 20	—	58	54	c p	Confused.
22	27 14	86 49	—	—	—	—	S.Ely.
23	28 20	88 6	—	—	—	c	—
24	37 13	10 49 E.	29·98	85	—	fine	—
26	44 58	7 55 W.	? 30·32	69	—	c	W.N.Wly.
32	49 43	27 21	30·19	62	59	clear	—
34	41 37	65 12	29·87	68	68	m	—
36	51 19	14 17	30·33	—	62	c	—
39	52 10	51 11	—	—	—	f	—
40	54 15	31 3	—	—	—	—	—
42	14 1	17 45	—	—	—	q	—
43	44 40	8 21	30·32	—	—	b c	High N.N.W. swell.
44	40 1	12 30	30·35	—	—	b c	—
46	12 11	28 42	29·97	81	—	c	—
47	22 6	27 39	—	74	—	fine	—
48	31 48	14 0	30·04	—	—	—	Heavy N.N.Ely.
53	Colon 9 22	79 54	—	—	—	b c	—
54	19 8	69 15	—	—	—	fine	—
55	49 39	29 5	30·14	61	57	c	—
61	51 5	12 46	30·24	60	62	—	—
66	44 33	45 58	30·21	70	74	fine and clear	—
69	49 0	61 50	29·81	58	—	fine and clear	Smooth.
70	56 31	21 15	? 30·11	58	54	o	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
73	55 49 N.	18 47 W.	29·96	59	—	b c	—
75	41 51	59 4	—	—	—	q p	—
76	Port au Prince, Hayti		—	—	—	c	—
77	21 22	92 10	? 29·90	84	—	fine and clear	—
78	Baltimore, U.S.		30·07	80	—	fine	—
86	30 25	65 36	—	—	—	fine	—
87	6 40	32 42	—	—	—	q g	—
88	Belize, Honduras		—	—	—	fine	—
93	50 40	16 56	30·38	61	60	c	N.N.W. swell.
96	48 34	31 59	30·17	64	62	c	—
99	42 23	53 30	30·06	70	63	c	—
100	51 10	12 19	30·20	59	60	c	Heavy Wly. swell.
101	50 29	25 24	? 30·32	59	61	c	—
103	54 9	28 43	—	—	—	q r	—
104	48 45	68 0	—	—	—	clear	—
108	46 24	49 52	—	—	—	c	—
109	33 55	60 56	—	—	—	fine	—
110	11 15	28 53	—	81	—	clear	—
113	4 15	6 0 E.	—	—	—	r	—
136	16 50	25 3 W.	—	—	—	clear	—
139	27 12	20 0	—	—	—	m	—
145	49 17	67 10	—	—	—	c	—
146	48 1	48 17	—	—	—	f	—
149	49 25	42 25	—	—	—	—	—
151	5 33	0 10	—	—	—	c	—
152	Elmina, W.C. Africa		—	—	—	g q p	*See* 244, 257, & 262.
153	4 3	9 42 E.	—	—	—	m r	—
154	31 14	16 31 W.	—	—	—	fine	Heavy Nly.
155	5 10	9 50	—	—	—	g e r	—
156	44 33	12 36	—	—	—	fine	—
158	13 24	27 19	—	—	—	p	—
164	Sydney, Cape Breton		—	—	—	g	—
166	17 22	28 1	—	—	—	fine	—
167	23 0	24 58	—	—	—	o	—
168	37 25	29 0	—	—	—	r	—
169	50 31	58 47	4 P.M. ? 30·15	57	—	fine	—
173	51 5	10 7	30·25	60	60	b c	Strong W.N.W. swell.
174	37 16	7 48 E.	30·00	89	81	b	Smooth.
175	43 32	26 20 W.	30·32	72	70	b c	Moderate W.S.W. swell.
177	46 20	20 33	30·30	70	67	b c	N.N.Wly. swell.
178	Newcastle, England		29·81	63	68	c	—
179	17 0	32 10	30·00	75	77	q p	Short N.N.E.
180	56 2	6 8 E.	29·61	58	60	o m	—
181	30 54	59 40 W.	30·16	83	81	c b	High Nly.
184	74 0	11 15	29·57	38	35	b	Heavy N.E. swell.
185	24 45	38 0	30·12	79	77	b	Moderate.
187	24 1	55 55	30·16	81	80	b	Smooth.
194	59 38	41 6	29·74	48	48	o v	Smooth.
195	41 16	53 18	30·16	74	74	b c	Smooth.
202	12 53	30 5	29·97	80	81	b c	Slight Nly. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
203	14 31 N.	27 34 W.	30·00	82	82	c	Light S.S.Wly.
204	12 38	26 0	30·01	79	79	c r	S.S.Wly. swell.
205	14 53	25 54	29·98	79	79	p	Confused.
206	37 8	1 24 E.	29·95	80	79	b	Slight.
209	15 29	26 58 W.	30·00	77	78	o r	N.N.E. & S.S.W. swells.
210	53 50	56 25	29·73	51	—	c	—
213	12 34	28 15	29·98	78	80	p	N. and S swells.
216	Porto Praya, C. Verd I.		30·01	80	—	c	—
224	14 58	23 26	30·03	80	80	b c	—
227	Despair Bay, N.F.		29·78	58	55	o f	—
228	Halifax, N.S.		29·82	65	—	b c	*See* 248 and 266.
231	Gibraltar		—	78	—	b c	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	83	—	b c	—
234	Port Royal, Jamaica		30·07	81	—	b c	*See* 243, 250, and 267.
236	Portland, England		29·94	74	—	b c	*See* 237 and 265.
237	Portland, England		29·82	70	—	b c	—
238	Spithead		30·01	65	—	b c q	*See* 256 and 258.
240	Barbadoes		30·00	82	—	b c	—
242	Gibraltar		30·07	76	—	b	—
243	Port Royal, Jamaica		29·96	83	—	b c	—
244	Elmina, W.C. Africa		30·04	77	—	c	—
245	Truxillo, Honduras		29·99	82	—	b c p	—
247	Gibraltar		30·08	79	—	b c q	—
248	Halifax, N.S.		29·81	72	—	b c	—
250	Port Royal, Jamaica		29·91	80	—	b c	—
254	4 55	2 53	30·05	80	—	b c	—
256	Spithead		30·06	66	—	b c q	—
257	Elmina, W.C. Africa		29·99	72	72	c r	—
258	Spithead		29·91	68	—	b c	—
259	Gibraltar		30·07	80	—	b c	—
261	55 45	1 45	29·78	57	—	b c	—
262	Elmina, W.C. Africa		29·99	73	72	o c	—
263	Lagos, W.C. Africa		29·96	82	—	c p	—
265	Portland, England		30·07	68	—	b c	—
266	Halifax, N.S.		—	60	—	b c	—
267	Port Royal, Jamaica		29·97	87	—	b c	—
268	Red Bay, Str. Belle Isle		29·69	58	—	c f	—
269	Gibraltar		29·97	81	—	b	—
274	36 50	14 48	—	—	—	clear	—
278	58 55	38 25	29·59	51	50	o r	Heavy cross.
279	Nassau, New Providence		30·03	82	82	c m	—
280	39 10	9 35	30·24	—	—	fine	—
281	40 40	26 5	—	—	—	fine	—
286	10 29	68 0	29·99	80	80	fine	—
288	11 45	53 35	—	82	82	b c	—
292	Goree, W.C. Africa		—	82	—	—	—
293	Gaboon River, W.C. Africa		29·94	82	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·89	79	—	S. 1	—
2 P.M.			29·90	80	—	W. 1	—

AUGUST 10, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	48 5 N.	7 0 W.	—	66	—	c	Heavy N.Wly.
7	55 24	7 29	—	—	—	clear	—
8	41 30	41 56	? 30·27	76	75	c	—
9	55 6	11 43	29·97	—	—	r	—
10	44 4	57 34	—	—	—	f	—
11	54 49	22 48	29·93	60	56	c	Smooth.
22	25 22	84 5	—	—	—	fine and clear	—
26	46 57	9 36	? 30·31	72	—	fine	—
31	51 55	7 25	—	—	—	r	—
32	50 49	18 55	30·18	61	58	c	—
33	40 22	70 3	30·11	69	70	m	—
34	40 31	71 52	30·08	72	66	o	—
36	50 31	21 0	30·21	59	60	m	Slight Wly.
39	51 13	57 23	—	—	—	c	—
40	54 11	30 57	—	—	—	c	—
42	17 43	17 38	—	—	—	fine	—
43	47 55	5 44	30·30	—	—	b c	N.N.W. swell.
44	36 51	14 55	30·27	—	—	b c	—
46	13 25	27 49	29·99	81	—	c	—
47	23 56	28 56	—	74	—	o	—
48	34 44	12 15	30·12	—	—	c	Heavy N.N.Ely.
53	Colon		29·96	—	—	b c	—
	9 22	79 54					
54	18 25	67 8	—	—	—	fine	—
55	48 17	35 18	—	62	60	fine	—
61	50 42	18 54	30·14	64	62	o	Wly.
66	42 56	53 2	30·07	67	72	p	—
69	48 32	68 31	30·04	52	—	c	—
70	56 16	12 26	? 29·91	55	55	o	—
73	55 59	23 58	29·84	61	—	b c	—
75	43 0	54 22	—	—	—	fine	—
76	20 40	73 5	—	—	—	fine	—
86	31 4	64 49	—	—	—	c	—
87	8 25	32 49	—	—	—	q p	—
88	17 32	88 5	—	—	—	sultry	—
96	50 11	24 27	30·22	62	60	c	—
99	41 47	59 15	30·02	70	69	c	—
100	50 22	18 30	30·18	63	60	c	—
101	49 26	31 2	? 30·40	64	62	fine	W.S.Wly.
102	40 25	70 10	—	—	—	fine	—
103	54 21	29 10	—	—	—	m	—
104	Off Bic Island, R. St. Lawrence		—	—	—	clear	—
108	46 15	52 0	—	—	—	f	—
109	34 57	58 51	—	—	—	fine	—
110	12 20	29 16	—	84	—	clear	—
113	Bonny, W. C. Africa		—	—	—	sultry	—
136	19 11	23 54	—	—	—	clear	—
139	24 57	21 30	—	—	—	fine	—
142	8 43	58 13	—	—	—	fine and clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
145	49 15 N.	67 30 W.	—	—	—	clear	—
146	47 34	47 55	—	—	—	f	—
149	49 16	42 58	—	—	—	u	—
154	Funchal, Madeira		—	—	—	fine	—
155	6 19	10 50	—	—	—	q r	—
156	40 31	14 23	—	—	—	clear	—
158	12 56	27 2	—	—	—	p	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	18 55	29 10	—	—	—	fine	—
167	21 1	24 15	—	—	—	m	—
168	38 31	32 28	—	—	—	m r	—
169	52 6	53 50	{ 3·30 P.M. ? 29·98 }	47	—	fine	—
173	52 5	6 20	30·11	57	58	o	Smooth.
174	37 1	3 14 E.	30·08	83	76	b m	N.E. swell.
175	44 21	24 20 W.	30·45	71	68	c b d	—
177	47 11	17 27	30·31	65	65	o d	Slight Wly. and N.N.E.
178	52 11	1 36 E.	30·00	61	63	c p	—
179	19 16	33 54 W.	30·07	75	76	c	Short N.Ely.
180	56 58	11 37 E.	29·42	59	62	b c q	—
181	32 13	58 3 W.	30·28	81	80	b	W.N.Wly. and N.N.Ely. swells.
183	18 42	79 12	30·04	84	83	b c	Smooth.
184	73 9	8 30	29·56	37	36	o	N. swell.
185	26 34	39 26	30·21	80	77	b c	—
187	25 21	58 31	30·21	82	81	b	E.S.Ely.
194	58 24	43 31	29·79	42	43	c m	Heavy Nly. and Sly. swells.
195	42 34	48 27	30·17	62	58	o f	Confused Wly.
202	12 10	29 36	30·00	81	81	b c	—
203	13 28	28 25	30·02	81	83	c b	Heavy S.S.Wly.
204	10 18	23 14	30·03	80	78	c	Smooth.
205	13 53	25 50	29·95	83	81	p	Confused.
206	37 23	3 44 E.	30·08	78	77	c b	Heavy S.E. swell.
209	14 11	27 14 W.	29·99	81	81	b c	Quick Sly. swell.
210	53 50	56 25	29·85	51	50	c	—
213	11 14	27 22	30·00	79	81	p q	N. and S. swells.
216	14 2	23 7	29·98	78	79	o	Smooth.
221	Cowes		30·12	63	—	b c	—
224	16 10	24 12	29·99	76	78	b c	—
227	Despair Bay, N.F.		29·84	36	57	o c m	—
228	Halifax, N.S.		29·99	60	—	b c	*See* 248 and 266.
231	Gibraltar		30·04	78	—	b c q	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	83	—	b	—
233	Cape Coast Castle, W. C. Africa		30·04	77	—	o m	*See* 244, 257, and 262.
234	Port Royal, Jamaica		30·06	78	—	b c	*See* 243, 250, and 267.
236	Portland, England		30·04	65	—	c	*See* 237 and 265.
237	Portland, England		30·03	64	—	c q	—
240	Barbadoes		30·01	82	—	b c	—
242	Gibraltar		30·04	79	—	b c q	—
243	Port Royal, Jamaica		29·98	82	—	b c	—
244	Secondee, W. C. Africa		30·08	77	—	c	—
245	Roatan I., Honduras		29·99	80	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
247	Gibraltar		30·08	79	—	b c q	—
248	Halifax, N.S.		29·84	66	—	b c	—
250	Port Royal, Jamaica		30·00	80	—	b c	—
254	4 45 N.	2 5 W.	30·06	79	—	b c	—
257	Cape Coast Castle, W. C. Africa		29·95	73	—	c m	—
259	Gibraltar		30·07	79	—	b c q	—
261	Holy Island, N.E. Coast Eng.		29·91	60	—	b c	—
262	Elmina, W. C. Africa		—	—	—	c	—
263	Lagos, W. C. Africa		30·01	79	—	r	—
265	Portland, England		30·14	63	—	c	—
266	Halifax, N.S.		—	60	—	b c	—
267	Port Royal, Jamaica		30·04	78	82	b c	—
268	Spear Harbour, Labrador		29·86	60	—	b	—
269	Gibraltar		29·97	81	—	b	—
274	38 10	34 5	—	—	—	clear	—
278	38 5	41 0	29·75	49	48	b c	Cross.
279	Nassau, New Providence		30·11	80	82	o g q r	Smooth.
280	36 39	8 8	30·04	—	—	fine	—
281	40 45	26 30	—	—	—	fine	—
286	La Guayra		30·00	82	77	c b	Calm.
288	10 37	66 57					
292	13 15	55 55	—	82	84	c b	—
293	Goree, W. C. Africa		—	84	—	—	—
	Gaboon River, W. C. Africa		29·94	82	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·89	81	—	S.W. 1	—
2 P.M.			29·88	84	—	W. 2	—

AUGUST 11, 1873.

3	48 6 N.	7 59 W.	30·20	65	—	c p′	—
7	55 13	14 10	29·82	—	—	c	—
8	41 47	44 14	? 30·15	74	75	c	—
10	42 27	62 15	—	—	—	fine and clear	—
11	55 13	13 43	29·82	58	60	c	Smooth.
24	34 39	18 45 E.	29·94	83	—	fine	—
26	36 55	8 43 W.	? 30·14	75	—	fine	—
31	59 36	11 25	—	—	—	c	Heavy W.S.Wly.
33	41 37	62 58	30·15	61	64	clear and fine	—
36	49 44	27 50	30·09	—	—	g	W.S.Wly.
39	49 0	62 37	—	—	—	fine	—
40	54 27	31 58	—	—	—	c	—
42	21 23	17 33	—	—	—	m	—
43	Brest		30·16	—	—	b c m	—
44	33 7	16 10	30·20	—	—	fine	—
46	14 8	29 14	—	—	—	p′	—
47	26 9	30 12	—	74	—	o	—
48	38 2	9 49	30·11	—	—	m	High Nly.
53	Colon		29·96	—	—	r	—
	9 22	79 54					

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
54	17 54 N.	66 28 W.	—	—	—	o	—
55	46 22	42 6	30·04	68	65	o	—
56	51 10	13 46	30·01	68	62	c	Wly.
61	50 13	25 7	30·05	63	—	fine	Wly.
66	42 14	60 13	30·11	79	74	fine	—
73	55 59	28 21	29·67	56	54	o r m	—
75	43 22	49 16	—	—	—	fine	—
76	23 0	71 4	—	—	—	fine and clear	Smooth.
86	31 36	63 47	—	—	—	fine and clear	—
87	9 51	33 3	—	—	—	f q r	—
88	17 30	88 3	—	—	—	c	—
96	51 19	16 21	30·08	62	60	clear	—
99	41 10	65 17	30·11	67	74	clear	—
100	49 25	24 22	30·20	58	54	c	—
101	47 49	36 32	? 30·08	67	64	f	—
102	40 49	63 19	—	—	—	c	—
103	54 48	30 38	—	—	—	f	—
108	44 53	52 30	—	—	—	fine	—
109	35 25	57 21	—	—	—	c	—
110	12 23	29 30	—	83	—	c	—
113	Bonny, W. C. Africa		—	—	—	p	—
136	22 4	22 35	—	—	—	c q	Heavy N.Ely.
139	22 43	22 48	—	—	—	clear	—
142	10 32	58 30	—	—	—	clear	—
146	46 40	46 25	—	—	—	f	—
149	30 17	45 0	—	—	—	clear	—
151	4 45	1 54	—	—	—	fine	—
154	34 15	15 37	—	—	—	fine	Heavy N.N.Ely.
155	6 27	11 9	—	—	—	fine	—
156	36 24	15 56	—	—	—	fine	—
158	11 33	20 43	—	—	—	r	Strong Sly.
164	Sydney, Cape Breton		—	—	—	fine	—
166	20 9	30 18	—	—	—	c	—
167	18 55	25 6	—	—	—	m	—
168	56 46	31 35	—	—	—	g c	—
169	53 21	48 40	3 P.M. ? 29·97	50	—	fine	—
174	36 30	1 17	30·13	86	78	h	Smooth.
175	45 6	22 34	30·33	69	68	c	Long W.N.Wly. swell.
177	48 10	13 44	30·30	65	63	o	N.Wly. swell.
179	21 19	35 35	30·08	75	76	b c	Short N.E.
180	55 17	13 56 E.	29·76	58	61	b c	—
181	33 3	56 59 W.	30·23	82	81	h	Smooth.
183	18 47	79 58	30·03	85	84	b c	Smooth.
184	22 28	7 30	29·56	84	87	c	Smooth.
185	28 9	39 45	30·22	82	78	b c	Heavy N.N.E. swell.
187	26 35	60 53	30·19	82	81	h	Ely.
189	Halifax, N.S.		30·15	66	65	clear	Smooth. See 228, 248, and 266.
194	58 46	44 43	29·57	47	47	c q	Short Wly.
195	45 10	41 26	30·06	70	67	o m	Smooth.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
202	10 30 N.	28 58 W.	29·98	79	80	b c	Rather rough S.S.Wly.
203	11 56	28 19	29·98	81	82	c p	Heavy S.S.Wly.
204	7 51	21 8	30·01	80	79	c	Smooth.
205	11 40	25 33	29·90	82	81	p o	Very confused.
206	37 58	4 13 E.	30·13	78	80	b	Slight.
209	12 12	27 13 W.	29·93	80	81	b c	—
210	53 50	56 25	29·76	49	—	o f	—
213	8 34	26 6	29·98	76	78	o d	—
216	12 37	22 40	29·93	78	79	c b	Smooth.
221	Cowes		30·01	67	—	o	—
224	16 48	25 20	29·96	82	78	b c	—
227	Hermitage Cove, N. F.		29·95	60	56	b c	—
228	Halifax, N. S.		30·10	60	—	b c	—
231	Gibraltar		30·00	78	—	b c q	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	80	—	b c	—
233	Cape Coast Castle, W. C. Africa		30·12	76	—	b c m	*See* 254, 257, and 262.
234	18 53	74 54	29·98	83	—	b c	—
236	Portland, England		29·93	70	—	b c	*See* 237 and 265.
237	Portland, England		29·84	68	—	c	—
240	Barbadoes		30·03	80	—	b c p	—
242	Gibraltar		30·08	80	—	b c	—
243	Port Royal, Jamaica		29·99	83	—	b c	*See* 250.
244	4 55	1 40	30·07	81	—	b c	—
245	Roatan I., Honduras		29·95	80	—	b c	—
247	Gibraltar		30·11	78	—	b c q	—
248	Halifax, N. S.		30·09	71	—	b c	—
250	Port Royal, Jamaica		30·00	81	—	b c	—
254	Elmina, W. C. Africa		30·06	80	—	b c	—
257	Cape Coast Castle, W. C. Africa		30·08	77	—	b c	—
259	Gibraltar		30·12	79	—	c q	—
261	Holy Island, N. E. Coast Eng.		29·82	64	—	b c	—
262	Elmina, W. C. Africa		30·01	78	70	b c	—
263	Lagos, W. C. Africa		30·00	81	—	b c	—
265	Portland, England		30·02	68	—	b c	—
266	Halifax, N. S.		—	59	—	b c	—
267	18 47	74 56	30·00	84	84	b c	—
268	Spear Harbour, Labrador		29·85	59	—	c	—
269	Gibraltar		30·01	78	—	b c q	—
274	38 55	33 45	—	—	—	clear	—
277	57 40	12 25	—	—	—	c	—
278	58 40	41 15	29·63	49	49	c m d	Heavy N.W.
279	Nassau, New Providence		30·14	83	83	c	Smooth.
280	26 15	4 52	30·04	—	—	fine	—
281	40 15	27 30	—	—	—	sultry	—
288	14 50	57 50	—	82	84	b c	—
292	Goree, W. C. Africa		—	82	—	—	—
293	Gaboon River, W. C. Africa		29·97	81	—	—	—
						Wind. Dir. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·88 29·90	82 84	— —	S.W. 3 W. 3	— —

AUGUST 12, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	47 45 N.	8 29 W.	—	71	—	c	—
7	54 58	19 43	29·74	—	—	m	Wly.
8	41 59	47 37	? 30·07	71	71	p	—
10	41 9	67 8	—	—	—	fine	Smooth.
22	28 19	79 36	—	—	—	fine	—
26	Gibraltar		? 30·13	77	—	—	*See* 231, 232, 242, 247, 259, and 269.
31	49 47	15 36	—	—	—	f	—
33	43 5	55 47	30·10	66	64	clear	—
36	48 20	33 56	30·16	63	60	clear	W.S.Wly.
39	48 47	68 4	—	—	—	clear	—
40	55 0	33 34	—	—	—	—	Very heavy.
42	24 15	17 17	—	—	—	m	Heavy Nly.
43	30 3	2 17	30·20	—	—	b e m	Wly. swell.
44	31 5	17 8	—	—	—	e b	—
46	15 47	31 39	29·99	79	—	g	—
47	28 42	31 30	—	75	—	—	—
48	38 37	9 24	30·23	—	—	b c	—
53	Colon	79 54	29·90	—	—	—	—
54	18 10	65 40	—	—	—	fine	—
55	43 51	48 5	30·10	57	61	o r	—
56	50 41	20 27	29·96	69	62	o d	Short Wly.
61	49 21	30 30	30·05	62	63	c	Strong W.S.Wly.
66	41 15	67 38	30·15	78	68	fine	—
73	55 53	34 3	29·57	53	53	p	—
75	44 25	44 30	—	—	—	c	—
76	25 7	68 39	—	—	—	fine	Smooth.
78	Baltimore, U.S.		29·98	82	—	c p	—
86	31 48	62 48	—	—	—	p	—
87	10 50	32 50	—	—	—	g c	—
88	17 25	87 32	—	—	—	c	—
96	51 40	8 38	30·04	56	56	f	—
99	40 38	71 41	30·13	64	73	clear	—
100	48 30	29 29	30·14	62	60	c	—
101	45 58	41 22	? 30·26	64	66	fine	W.S.Wly.
102	41 35	56 42	—	—	—	fine and clear	—
103	54 6	31 18	—	—	—	q	—
108	43 57	52 50	—	—	—	fine	—
109	36 19	55 10	—	—	—	cloudy	—
110	18 9	52 5	—	80	—	q	—
113	Bonny, W. C. Africa		—	—	—	p	—
135	0 15	29 13	—	—	—	clear	—
136	24 33	21 29	—	—	—	clear	Heavy N.N.Ely.
139	20 38	24 18	—	—	—	clear	—
142	12 0	59 5	—	—	—	fine	—
146	45 23	45 45	—	—	—	f	—
49	49 30	45 4	—	—	—	f	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
151	4 38 N.	5 25 W.	—	—	—	c	—
154	36 54	14 19	—	—	—	clear	Heavy N.N.Ely.
155	8 14	13 30	—	—	—	fine	—
156	Funchal, Madeira		—	—	—	fine	—
158	9 35	25 11	—	—	—	—	Strong Sly.
164	Sydney, Cape Breton		—	—	—	f	—
166	22 3	31 31	—	—	—	c	—
167	16 47	26 29	—	—	—	clear	—
168	56 10	31 55	—	—	—	q	—
169	54 30	42 0	3 P.M. ? 29·86	53	—	d	—
171	15 24	60 13	—	—	—	fine	—
174	36 6	5 26	30·08	83	77	b	Smooth.
175	45 53	19 50	30·21	71	67	c b m	—
177	49 10	10 26	30·17	69	63	c	W.S.Wly. swell.
179	23 36	36 53	30·17	75	76	c	Short N.Ely.
180	57 0	18 24 E.	29·99	58	—	b	—
181	33 49	55 38 W.	30·20	81	80	c	Smooth.
183	19 10	80 51	30·05	83	—	b c	Very smooth.
184	71 21	6 0	29·43	40	39	c	Light S.E. swell.
185	29 44	39 36	30·32	81	77	c b m	Heavy N.N.Ely. swell.
187	27 24	62 19	30·19	82	82	b	S.Ely.
189	41 38	64 1	30·18	69	63	b	Smooth.
194	59 29	45 16	29·46	40	39	b	Heavy W.
195	47 30	34 29	30·22	64	62	c	Confused Wly., slight.
202	8 12	26 58	29·99	78	80	g	Rather rough S.S.Wly.
203	10 14	28 4	29·97	78	80	o r	Heavy S.S.Wly.
204	6 44	17 9	30·04	79	78	o	Smooth.
205	10 16	23 55	29·98	80	79	p	Confused.
206	37 40	5 19 E.	30·21	76	76	b	Slight.
209	10 48	26 54 W.	30·03	78	80	o r q	Nly. and Sly.
210	53 30	56 25	29·89	49	—	o	—
213	7 11	23 0	30·01	79	79	b e	Slight S.Ely.
216	12 0	21 18	30·03	80	79	c	Smooth.
224	St. Vincent		30·02	80	74	o	—
227	Fortune Head, N.F.		30·08	56	54	b c	—
228	Halifax, N.S.		30·18	59	—	b c	*See* 248 and 266.
231	Gibraltar		30·09	76	—	b c q	—
232	Gibraltar		—	82	—	b c	—
233	Cape Coast Castle, W.C. Africa		30·08	75	—	b c m	*See* 254 and 257.
234	20 12	73 26	30·08	83	—	b c	—
236	Plymouth		30·12	67	—	b c q	*See* 237.
237	Plymouth		29·99	66	—	b c m	—
238	Spithead		30·25	69	—	b c	*See* 256 and 258.
240	11 20	60 40	30·06	82	82	b c	—
242	Gibraltar		30·14	79	—	b c q	—
243	Port Royal, Jamaica		29·98	80	—	b c	*See* 250.
244	Chama Bay, W.C. Africa		30·08	81	—	b c	—
245	Roatan I., Honduras		29·97	81	—	b c	—
247	Gibraltar		30·17	77	—	b c q	—
248	Halifax, N.S.		30·18	65	—	b c	—
250	Port Royal, Jamaica		29·98	82	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
254	Cape Coast Castle, W.C. Africa		30·04	82	—	b c	—
256	Spithead		30·09	72	—	b c	—
257	Cape Coast Castle, W.C. Africa		30·04	73	—	b c	—
258	Spithead		30·14	68	—	b c	—
259	Gibraltar		30·18	79	—	b c	—
261	Holy Island, N.E. Coast Eng.		29·87	57	—	b c	—
263	4 55 N.	3 50 E.	30·02	80	—	b c	—
266	Halifax N.S.		—	56	—	b c	—
267	20 4	73 30 W.	29·94	83	82	b c	—
268	Spear Harbour, Labrador		29·98	60	—	b c	—
269	Gibraltar		30·13	79	—	c	—
274	39 34	32 40	—	—	—	c	—
277	57 25	12 55	—	—	—	c	—
278	58 35	41 0	29·45	49	45	c b	W.N.W.
279	Nassau, New Providence		30·13	78	83	c	Smooth.
280	36 52	1 44	30·11	—	—	fine	Heavy.
281	40 5	28 0	—	—	—	sultry	—
286	12 30	71 35	29·97	80	80	b	—
288	16 10	60 35	—	85	83	b	—
292	Goree, W.C. Africa		—	82	—	—	—
293	Gaboon River, W.C. Africa		29·92	81	—	—	—
						Wkds. Dir. Force.	
11 A.M. / 2 P.M.	St. Louis, Senegal		29·00 / 29·96	75 / 72	—	S.S.E. 3 / N. 2	—

AUGUST 13, 1873.

3	48 21 N.	10 24 W.	30·21	68	—	fine and clear	—
7	54 39	23 34	29·81	—	—	—	Wly.
8	42 0	51 22	? 30·37	56	57	clear	—
10	40 33	72 43	—	—	—	c p	—
22	30 42	76 47	—	—	—	c l	—
24	31 48	28 0 E.	29·81	81	—	fine	—
26	36 39	0 58 W.	? 30·30	78	—	fine	—
31	49 45	19 12	—	—	—	m	Wly.
33	44 34	48 31	30·24	54	54	f	—
36	46 46	40 30	30·22	—	64	fine and clear	Light S.Wly. swell.
40	54 18	32 8	—	—	—	p	—
42	57 5	17 11	—	—	—	m	Nly.
44	27 26	17 34	30·05	—	—	b c	—
46	18 9	33 28	30·05	79	—	g	—
47	30 55	33 9	—	76	—	fine	—
48	43 5	9 37	30·13	—	—	m	—
53	10 44	82 51	29·94	—	—	—	—
54	St. Thomas, W.I.		—	—	—	fine	—
55	42 24	54 47	30·23	65	67	b c	—
56	49 45	26 42	30·03	62	60	fine	—
6	47 52	36 10	30·08	63	62	fine	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
73	55 46 N.	38 23 W.	29·73	52	49	q r	Heavy Wly.
75	45 55	39 43	—	—	—	clear	—
76	27 27	66 1	—	—	—	fine	—
86	32 6	62 16	—	—	—	g p	—
87	11 5	33 50	—	—	—	c	—
88	19 30	87 0	—	—	—	c	—
100	47 21	35 3	30·13	61	60	clear	—
101	44 3	47 16	?30·38	62	65	fine	—
102	42 53	50 12	—	—	—	f	—
103	54 12	31 44	—	—	—	c	—
108	43 48	53 56	—	—	—	fine	—
109	36 59	52 48	—	—	—	c	—
110	14 7	35 13	—	79	—	c	—
113	Bonny, W.C. Africa		—	—	—	p	—
135	4 19	27 57	—	—	—	fine	—
136	26 57	20 10	—	—	—	clear	—
139	19 5	25 25	—	—	—	clear	—
142	13 5	59 17	—	—	—	clear	—
146	45 2	46 0	—	—	—	f	—
149	48 14	46 41	—	—	—	clear	—
151	4 15	7 38	—	—	—	c	—
152	6 2	1 10 E.	—	—	—	—	—
154	39 34	13 3 W.	—	—	—	c	Heavy N.N.Ely.
156	30 35	16 38	—	—	—	m	—
158	8 27	23 25	—	—	—	m	—
162	17 45	76 5	—	—	—	fine	S.Ely.
164	Sydney, Cape Breton		—	—	—	f *	—
166	24 25	32 52	—	—	—	fine	—
167	15 26	27 5	—	—	—	clear	—
168	57 13	32 20	—	—	—	q r	—
169	55 30	34 36	3 P.M. ?29·56	56	—	p	—
171	17 32	60 45	—	—	—	p q	—
174	37 55	9 7	30·16	82	65	b	Smooth.
175	46 39	17 47	30·27	70	66	c	W.N.Wly. swell.
177	49 42	5 56	30·18	63	63	b c	Short high Wly. swell.
179	26 16	38 6	30·28	75	76	b c	Short N.Ely.
180	59 28	23 34 E.	30·00	63	—	b	—
181	34 48	54 9 W.	30·23	79	80	b c	Smooth.
183	19 42	82 7	30·09	87	83	b c	Very smooth.
184	70 45	3 41	29·89	49	50	o f	Short cross.
185	31 9	39 20	30·39	86	77	b	Long N.Ely. swell.
187	28 3	63 37	30·21	81	82	b	Smooth.
189	38 2	64 11	30·10	78	81	r l	Turbulent.
193	57 53	1 25	29·59	52	54	r t o q	Smooth.
194	58 59	46 20	29·53	41	46	c q	Heavy N.Wly. swell.
195	49 44	27 10	30·08	63	62	c b	Confused.
202	7 9	24 30	30·07	79	79	b c	Slight S.S.Wly.
203	9 17	26 13	30·08	80	80	c b	Heavy E.S.Ely.
204	6 20	13 56	30·07	81	79	c b	Smooth.
205	9 12	22 45	30·04	79	79	p	Short hollow S.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
206	37 49 N.	6 54 E.	30·24	77	79	b c	Slight.
209	9 38	24 52 W.	30·06	79	79	b c	Nly. & Sly., Sly. prevailing.
210	53 50	56 25	29·96	46	—	o	—
213	6 12	21 19	30·08	79	80	b c	S.E.
216	10 32	20 33	30·05	82	78	c	Smooth.
224	17 45	25 3	30·00	78	76	b c	—
227	Lamelin Island. 46 50	55 46	30·22	56	58	b c	—
228	Halifax, N.S.		—	—	—	b c	*See* 248.
231	Gibraltar		30·19	77	—	b c q	*See* 232, 242, 259, & 269.
232	Gibraltar		—	84	—	b c m	—
233	Cape Coast Castle, W. C. Africa		30·08	75	—	b m	*See* 257.
234	22 0	73 29	30·11	83	—	b c	—
236	50 30	5 25	29·99	69	—	b c	—
237	49 38	5 24	30·03	65	—	b c	—
238	49 36	2 24	30·06	67	—	b c	—
240	Tobago, W.I.		30·06	81	—	b c	—
242	Gibraltar		30·11	78	—	b c q	—
243	Port Royal, Jamaica		30·03	81	—	b c l	*See* 250.
244	5 0	1 30	30·06	78	—	b c	—
245	Roatan I., Honduras		29·99	81	—	b c	—
248	Halifax, N.S.		30·26	70	—	b	—
250	Port Royal, Jamaica		29·97	80	—	b c	—
256	50 27	2 27	30·09	70	—	b c	*See* 258.
257	Cape Coast Castle, W.C. Africa		30·05	75	—	b c	—
258	50 27	2 27	30·00	68	—	b c	—
259	Gibraltar		30·23	79	—	c q	—
263	3 40	4 10 E.	30·02	78	—	c r	—
267	22 0	73 27 W.	30·06	84	83	b c	—
268	Chateau Bay 52 5	56 0	30·04	62	—	b c	—
269	Gibraltar		30·14	78	—	b c	—
274	40 8	31 31	—	—	—	clear	—
277	56 8	13 43	—	—	—	p	—
278	58 25	41 15	29·50	46	48	c m	Heavy W.N.W.
279	Nassau, New Providence		30·13	83	83	c b	—
280	38 38	0 36 E.	30·20	—	—	fine	—
281	40 10	28 35 W.	—	—	—	fine	—
286	Sabanilla 11 1	75 1	29·92	82	80	b	—
288	17 10	62 45	—	81	84	b	—
292	Goree, W.C. Africa		—	82	—	—	—
293	Gaboon River, W.C. Africa		29·95	81	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·95	83	—	N.N.W. 4	—
2 P.M.			29·92	85	—	N.N.W. 3	—

AUGUST 14, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	49 15 N.	11 31 W.	—	68	—	d	—
6	40 19	72 29	—	—	—	r	Very high Ely.
7	53 47	27 46	29·82	—	—	c	Wly.
8	41 55	55 21	?30·28	69	74	clear	—
22	32 39	73 34	—	—	—	c l	—
26	37 4	4 8 E.	?30·26	78	—	fine	—
31	49 34	23 30 W.	—	—	—	—	Heavy Wly.
33	46 34	41 14	30·18	60	65	fine and clear	—
36	45 29	46 37	29·97	56	57	clear	—
40	54 55	31 41	—	—	—	d	—
42	29 50	17 1	—	—	—	c	—
44	23 43	17 54	29·93	—	—	m	—
46	20 44	34 57	30·09	77	—	c	—
47	32 57	34 51	—	76	—	fine	—
48	47 18	6 35	30·19	—	—	f	—
53	10 56	83 45	30·03	—	—	r	—
54	St. Thomas, W. I.		—	—	—	o	—
55	41 25	61 44	30·18	67	74	b c	—
56	48 38	33 29	30·02	63	60	fine	—
61	46 4	41 48	30·17	63	64	fine	—
73	54 47	42 43	29·78	46	47	b c	—
75	47 19	34 31	—	—	—	fine	—
76	29 54	63 18	—	—	—	fine and clear	—
86	32 34	60 56	—	—	—	fine	—
87	12 50	33 51	—	—	—	c	Short rough.
88	20 30	86 40	—	—	—	o	—
98	51 6	12 3	30·10	63	65	clear	High Wly.
100	46 2	40 31	30·18	60	60	clear	—
101	42 7	53 15	?30·39	70	75	fine	—
102	44 56	43 25	30·35	—	—	fine	—
103	51 44	31 18	—	—	—	c	—
108	43 20	55 20	—	—	—	fine	—
109	37 42	51 32	—	—	—	q r	—
110	14 45	37 58	29·77	79	—	r	—
113	Duke Town, Old Calabar, W. C. Africa		—	—	—	p	—
135	7 53	25 55	—	—	—	fine	—
136	29 33	18 51	—	—	—	c	N.N.Ely. moderating.
139	17 24	26 23	—	—	—	clear	W.S.Wly. swell.
142	14 35	59 5	—	—	—	clear	—
146	45 6	46 52	—	—	—	clear	—
149	48 32	47 6	—	—	—	clear	—
151	4 37	8 28	—	—	—	c	—
152	Lagos, W. C. Africa		—	—	—	g	Smooth.
153	3 56	8 41 E.	—	—	—	fine	—
154	42 24	11 34 W.	—	—	—	fine	N.N.Ely.
155	10 2	14 49	—	—	—	q r	Heavy W.N.Wly.
156	27 48	15 15	—	—	—	m	—
158	6 36	22 40	—	—	—	c	—
159	51 18	8 1	—	—	—	fine	Heavy W.S.Wly. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
162	17 53 N.	75 56 W.	—	—	—	fine	—
166	26 14	34 17	—	—	—	fine	—
167	14 22	27 32	—	—	—	o r	—
168	55 24	32 33	—	—	—	clear	—
169	56 8	27 23	2 P.M. ? 29·61	54	—	o	—
171	20 1	61 30	—	—	—	q	Heavy.
174	42 22	9 15	30·13	74	63	f	Moderate N.W. swell.
175	47 24	15 2	30·16	69	65	c m	W.N.Wly. swell.
177	50 12	3 19	30·21	66	—	b c	—
178	53 15	0 56 E.	30·03	65	62	c	—
179	28 22	39 18 W.	30·31	76	77	b c	Light N.Ely. swell.
181	35 43	52 42	30·24	80	79	c	Smooth.
183	20 15	83 4	30·11	85	83	b c	Very smooth.
184	69 10	3 35	29·11	50	50	f r	Short confused.
185	31 56	39 15	30·35	84	78	b	Smooth.
187	29 6	65 13	30·19	81	81	b	Smooth.
189	35 1	64 36	30·10	81	80	r	Turbulent.
190	50 57	13 46	30·10	62	62	c b	Slight Nly.
193	60 19	0 25	29·68	57	55	c p	Smooth.
194	59 2	46 1	29·68	43	46	b q	Heavy N.Wly.
195	54 0	18 52	30·08	63	62	c	Slight N.Wly.
202	5 39	22 33	30·07	79	80	b c	Smooth.
203	7 25	24 41	30·09	79	80	c b	Heavy Sly.
204	4 24	10 30	30·12	80	78	c	Smooth.
205	6 51	20 25	30·01	79	79	p	Short S.S.Ely.
206	38 3	8 47 E.	30·19	77	78	b	Slight.
209	7 38	23 37 W.	30·05	79	79	b c	Sly.
210	53 50	56 25	30·02	56	—	o	—
213	4 53	18 55	30·06	78	79	b c	Smooth.
216	9 26	18 33	30·00	80	79	c q	Smooth.
224	17 58	26 43	30·08	78	76	b c	—
225	1 1	18 38	30·07	81	74	b c	—
227	Burin 47 3	55 9	30·17	63	55	b c	—
228	Halifax, N.S.		30·26	61	—	b	*See* 248 and 266.
231	Gibraltar		30·19	78	—	b c q	*See* 232, 243, 247, 259, and 269.
232	Gibraltar		—	84	—	b c	—
234	23 8	72 25	30·14	83	—	b c	—
236	49 42	6 43	30·04	65	—	o m d	*See* 237 and 270.
237	49 40	6 45	29·95	64	—	c d m	—
240	11 0	61 34	30·07	80	—	b c	—
242	Gibraltar		30·16	78	—	b c q	—
243	Port Royal, Jamaica		30·02	82	—	b c	*See* 250.
244	Cape Coast Castle, W. C. Africa		30·08	78	—	b c	*See* 257.
245	Rontan I., Honduras		30·00	80	—	b c	—
247	Gibraltar		30·19	78	—	b c q	—
248	Halifax, N. S.		30·25	69	—	b	—
250	Port Royal, Jamaica		30·01	79	—	b c l	—
253	0 18	9 57	30·07	73	—	b	—
257	Cape Coast Castle, W. C. Africa		30·06	75	—	c m	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
259	Gibraltar		30·20	80	—	b c q	—
261	Holy Island, N.E. Coast Eng.		29·84	61	—	b c	—
263	2 55 N.	4 8 E.	—	—	—	b c	—
266	Halifax, N. S.		—	58	—	b c	—
267	23 10	72 13 W.	30·04	83	84	b c	—
268	51 24	36 0	30·09	56	44	c f	—
269	Gibraltar		30·10	80	—	b c	—
270	49 39	6 51	30·07	65	—	o m	—
274	40 33	29 55	—	—	—	fine	—
277	54 34	12 37	—	—	—	fine	—
278	57 25	42 0	29·74	47	47	c b	Heavy N.W.
279	Nassau, New Providence		30·11	83	82	c b	Smooth.
280	40 53	3 9 E.	30·16	—	—	fine	—
281	40 55	30 15 W.	—	—	—	clear	—
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·96	81	—	—	—
						Wind. Dir^n Force.	
11 A.M.	St. Louis, Senegal		29·88	81	—	N.W. 2	—
2 P.M.			29·86	84	—	N.W. 2	—

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3	50 14 N.	13 45 W.	29·71	68	—	f	—
6	40 29	69 14	—	—	—	f	Heavy Ely.
7	52 23	33 15	29·87	—	—	c	—
8	41 42	59 14	? 30·04	71	73	p	—
22	34 49	70 26	—	—	—	fine	—
26	37 27	9 30 E.	? 30·21	? 80	—	fine	—
31	49 22	28 1 W.	—	—	—	c	—
33	48 30	33 24	30·03	55	59	clear	—
36	44 17	53 0	30·24	64	65	fine and clear	—
40	53 13	33 8	—	—	—	c	—
44	20 10	18 17	29·90	—	—	b c	—
46	23 4	37 2	30·10	78	—	b c	—
47	33 39	35 50	—	78	—	fine	—
48	50 40	1 35	—	—	—	b c	—
53	Greytown 10 56	83 40	30·02	—	—	c r	—
54	St. Thomas, W. I.		—	—	—	fine	—
55	40 40	68 39	29·99	63	64	f	—
56	46 53	39 46	30·08	61	66	fine	—
57	51 45	8 12	30·11	—	—	f	—
61	44 4	47 25	30·18	62	—	fine	—
73	53 22	48 11	29·75	51	50	c	—
75	48 36	29 9	—	—	—	c	—
76	32 19	60 36	—	—	—	fine	—
77	21 5	97 0	29·89	88	—	fine	—
86	32 54	60 6	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
87	13 51 N.	34 2 W.	—	—	—	fine	Short confused swell from all points.
88	20 45	86 30	—	—	—	clear	—
98	50 31	18 18	29·89	60	60	c	—
100	44 7	46 9	30·20	65	63	fine	—
101	42 7	59 22	? 30·16	74	69	o	—
102	47 3	36 37	—	—	—	c	—
103	50 51	33 51	—	—	—	clear	—
108	43 9	56 55	—	—	—	fine	—
109	37 22	49 56	—	—	—	c	—
110	15 37	38 12	—	80	—	c	—
113	Duke Town, Old Calabar, W. C. Africa		—	—	—	sultry	—
132	0 50	28 11	—	—	—	c	—
135	11 34	24 23	—	—	—	c	—
136	32 28	17 0	—	—	—	m	—
139	15 32	27 28	—	—	—	clear	—
142	16 44	59 25	—	—	—	fine	—
146	44 55	48 7	—	—	—	f	—
149	48 40	48 27	—	—	—	clear	—
151	6 38	11 30	—	—	—	c	—
154	45 36	9 38	—	—	—	fine	—
155	12 9	17 20	—	—	—	q r	—
156	23 50	16 48	—	—	—	m	—
158	5 8	20 35	—	—	—	c	—
159	51 31	13 54	? 29·90	60	60	r	Rising.
162	17 42	75 43	—	—	—	fine	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	27 15	35 36	—	—	—	fine	—
167	11 18	27 32	—	—	—	o q	—
168	53 25	34 17	—	—	—	q	—
169	56 22	19 42	? 29·56	56	—	o	—
171	21 53	61 21	—	—	—	clear	—
174	44 44	8 25	30·13	75	68	o	N.W. swell.
175	48 12	11 43	30·07	69	65	c m	Heavy W.N.Wly. swell.
178	Newcastle, England		29·97	74	61	c	—
179	29 24	40 28	30·22	76	77	b c	Light N.Ely. swell.
181	36 26	51 33	30·18	80	77	c	Smooth.
183	20 39	83 18	30·04	88	85	b c	—
184	68 28	3 32	29·46	59	56	fine and clear	Smooth.
185	32 8	39 0	30·16	78	78	b c	Very smooth.
187	30 0	66 38	30·19	81	81	b	Smooth.
190	50 11	20 46	29·85	62	62	c	Rather rough W.N.W.
192	55 11	7 3	—	—	—	—	—
193	63 20	1 5 E.	29·72	58	55	b c	Strong S.Wly.
194	59 7	47 25 W.	29·56	46	47	o	Moderate N.Wly.
197	50 10	6 40	30·08	64	—	c m	Smooth.
200	51 3	15 34	29·90	63	61	o g m	S.W. & W.N.W. swells.
202	4 12	19 53	30·06	77	79	b c	Smooth.
203	5 21	22 24	30·08	78	80	b c	Heavy Sly.
204	3 25	11 37	30·06	80	79	c	Smooth.
205	5 8	17 36	30·02	78	79	b v	Short S.S.Ely.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
206	37 28 N.	10 30 E.	30·14	79	78	b	Smooth.
209	5 21	21 54 W.	30·03	79	79	b c	—
210	53 45	56 30	29·66	69	—	c	—
213	3 28	17 6	30·05	76	78	b	Very smooth.
216	8 29	18 3	30·01	77	78	o q p	Smooth.
224	18 24	28 47	30·04	76	76	b c	—
225	3 35	19 55	30·05	79	76	b c	—
227	46 45	54 45	30·15	57	55	b e f	—
228	Halifax, N.S.		—	—	—	o	*See* 248 and 266.
231	Gibraltar		30·11	78	—	b c	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	80	—	b c	—
233	4 55	1 30	30·07	76	—	b c	—
234	24 48	71 35	30·13	84	—	b c	—
240	Port of Spain, Trinidad		30·05	80	—	b c	—
242	Gibraltar		30·12	80	—	b c q	—
243	Port Royal, Jamaica		30·04	83	—	b c	*See* 250.
245	16 3	87 45	30·00	81	—	b c	—
247	Gibraltar		30·11	80	—	b c	—
248	Halifax, N.S.		30·17	62	—	o	—
250	Port Royal, Jamaica		30·00	80	—	b c	—
253	1 8	9 50	30·05	73	—	b c	—
254	Axim Bay, W. C. Africa		30·08	80	—	o	—
256	51 51	5 50	30·05	65	—	f	—
257	Cape Coast Castle, W. C. Africa		30·03	74	—	e	—
259	Gibraltar		30·15	79	—	b c	—
261	Holy Island, N. E. Coast Eng.		29·97	67	—	—	—
263	2 22	3 43 E.	30·03	81	—	b c	—
266	Halifax, N.S.		—	66	—	b c	—
267	24 40	71 30 W.	30·06	83	82	b c	—
268	Croque Harbour		30·00	70	—	b c	—
	51 5	55 50					
269	Gibraltar		30·05	79	—	b c	—
274	41 14	28 1	—	—	—	clear	—
277	55 45	13 47	—	—	—	fine	—
278	56 50	42 25	29·77	49	49	c m	N.W. cross.
279	Nassau, New Providence		30·07	83	84	b c	Smooth.
280	Marseille		30·17	—	—	fine	—
281	41 55	31 0	—	—	—	u	—
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·98	79	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·84	86	—	N.W. 1	—
2 P.M.			29·87	78	—	W.N.W. 2	—

AUGUST 16, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	50 22 N.	14 18 W.	30·01	60	—	q	—
6	41 22	64 49	—	—	—	fine and clear	Smooth.
7	50 35	37 43	29·94	—	—	c	Wly.
8	41 22	62 11	—	80	79	—	—
22	36 45	67 1	—	—	—	fine	—
26	35 56	14 53 E.	? 30·22	82	—	fine	—
31	49 0	32 21 W.	—	—	—	clear	N.Wly.
33	49 54	24 54	30·19	58	59	c	—
36	43 2	59 16	29·95	67	67	f	—
37	51 11	13 44	29·84	58	59	—	Heavy Wly.
40	52 26	35 45	—	—	—	c	—
42	34 23	14 53	—	—	—	fine	—
44	16 39	18 0	29·94	—	—	c d	—
45	48 56	4 50	30·07	80	—	c	S.Wly. swell.
46	24 46	38 40	30·11	80	—	fine	—
47	35 15	34 21	—	76	—	b c	—
53	Greytown 10 56	83 40	29·95	—	—	r	—
54	St. Thomas, W.I.		—	—	—	fine	—
56	44 43	45 50	30·23	67	68	fine	—
57	51 14	14 0	30·02	58	57	q	High Wly.
61	42 54	53 22	30·05	67	68	fine	—
73	52 18	23 27	29·86	52	48	b c	—
75	49 22	23 12	—	—	—	c	—
76	34 42	57 51	—	—	—	fine	—
84	50 17	2 57	—	67	—	fine	—
86	33 19	59 0	—	—	—	fine	—
87	14 39	35 1	—	—	—	g o	—
97	50 50	14 30	29·92	61	60	q	Heavy Wly.
98	49 53	23 29	30·16	56	60	c	High Wly.
100	42 11	51 54	30·17	63	53	f	—
101	41 37	65 11	? 30·03	74	72	m	—
102	49 20	29 30	—	—	—	c	—
103	50 53	36 14	—	—	—	g	—
105	Cow Bay, N.S.		—	—	—	m r	—
108	43 27	60 15	—	—	—	fine	—
109	38 22	49 22	—	—	—	fine	—
110	17 24	38 43	—	79	—	c	—
113	Cameroons River, W. C. Africa		—	—	—	sultry	—
132	4 12	27 2	—	—	—	fine and clear	—
135	14 35	22 32	—	—	—	c	—
136	Funchal, Madeira		—	—	—	hot	—
139	13 43	28 18	—	—	—	clear	—
142	19 43	60 12	—	—	—	fine	—
146	45 48	49 45	—	—	—	fine	—
149	47 33	46 43	—	—	—	f	—
151	8 31	13 21	—	—	—	c	—
152	4 11	6 2 E.	—	—	—	g r	—
154	49 7	8 10 W.	—	—	—	clear	Very heavy.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
155	13 30 N.	16 36 W.	—	—	—	c	—
156	20 4	17 49	—	—	—	m	—
158	4 29	19 8	—	—	—	clear	—
159	51 19	18 28	? 30·15	60	60	—	Heavy.
162	18 35	74 55	—	—	—	c	—
164	Sydney, Cape Breton		—	—	—	m	—
166	27 44	36 29	—	—	—	hot	—
167	9 6	25 44	—	—	—	o	—
168	53 5	36 45	—	—	—	c	—
169	55 54	12 22	? 29·64	55	—	p	—
171	25 17	64 24	—	—	—	fine	—
172	55 31	11 47	29·65	—	—	c	Heavy W.S.Wly. swell.
174	48 0	5 37	30·08	70	64	c	N.W. swell.
175	49 9	7 28	30·04	66	64	c b	—
178	54 30	0 36	29·76	65	67	c	—
179	29 57	40 30	30·12	76	76	b c	Smooth.
181	38 22	30 28	30·14	77	77	c	Moderate.
182	Crane Island, R. St. Lawrence		29·64	72	55	c	—
183	21 9	83 19	30·02	86	84	b c	—
184	67 56	2 30	29·60	52	50	o	Short high.
185	32 59	38 14	30·12	76	77	c b g	Confused.
187	31 2	67 52	30·18	81	81	b	Heavy N.Wly. swell.
189	32 5	64 43	30·24	83	81	b	Wly. swell.
190	49 18	26 49	30·22	60	61	b c	Moderate N.W.
192	55 49	10 6	29·42	60	57	b c p q	Moderate S.Wly.
193	65 31	2 55 E.	29·80	61	55	o g	Strong S.Wly.
194	60 22	48 11 W.	29·61	39	36	f	Heavy W.N.Wly. swell.
197	50 12	8 5	29·97	62	—	b c	Heavy Wly. swell.
200	50 7	22 3	30·18	66	60	c q	Moderate W.N.Wly. swell.
202	3 28	18 53	30·07	78	78	b c	S.Ely. swell.
203	4 18	20 24	30·09	79	81	b c	Heavy Sly.
204	2 46	14 33	30·12	78	77	b	Smooth.
205	4 4	17 55	30·04	77	78	b c v	Smooth.
206	37 30	11 6 E.	30·16	81	81	b	Calm.
209	4 17	22 14 W.	30·05	79	79	b c	—
210	53 45	56 30	29·90	62	53	b	—
213	1 56	19 32	30·08	75	79	b c	Smooth.
216	7 9	16 12	30·06	79	79	c b	Smooth.
224	19 19	30 58	30·09	76	75	b c	—
225	6 4	20 36	30·04	80	79	b c	—
227	Colinet Harbour, N.F.		30·01	62	57	b c	—
228	Halifax, N.S.		29·88	66	—	o	*See* 248 and 266.
231	Gibraltar		30·20	79	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	84	—	b	—
233	Cape Coast Castle, W. C. Africa		30·09	74	—	b c m	*See* 257.
234	26 4	70 27	30·14	81	—	o q r	—
236	51 35	7 32	29·78	62	—	b c q	*See* 237 and 270.
237	51 33	7 23	29·71	65	—	b c q	—
240	Port of Spain, Trinidad		29·98	77	—	b c	—
242	Gibraltar		30·15	79	—	b c	—
243	Port Royal, Jamaica		30·02	80	—	b c	*See* 250.
245	Port Cortez, Honduras		29·93	84	—	b c	—
247	Gibraltar		—	—	—	—	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
248	Halifax, N.S.		29·96	66	—	c m	—
250	Port Royal, Jamaica		30·00	77	—	b c	—
253	5 53 N.	8 49 W.	30·06	74	—	b c	—
254	Axim Bay, W. C. Africa		30·11	81	—	b c	—
257	Cape Coast Castle, W. C. Africa		30·06	73	—	b c	—
259	Gibraltar		30·16	80	—	b c	—
261	Holy Island, N. E. Coast Eng.		—	—	—	b c q	—
263	1 21	5 0 E.	29·99	80	—	b c	—
266	Halifax, N.S.		—	67	—	b c	—
267	26 0	70 22 W.	30·05	80	82	o r	—
268	Croque Harbour 51 5	55 50	30·00	67	—	b c	—
269	Gibraltar		30·07	77	—	b c	—
270	51 35	7 31	29·83	64	—	b c q r	—
274	41 42	27 0	—	—	—	fine	—
277	35 15	18 14	—	—	—	c	—
278	37 15	44 45	29·73	49	48	b c	Heavy N.W.
279	Nassau, New Providence		30·07	82	83	c b	Smooth.
281	42 30	32 45	—	—	—	fine	—
293	Gaboon River, W. C. Africa		29·93	82	—	—	—
11 A.M. / 2 P.M.	St. Louis, Senegal		29·93 / 29·88	80	—	Wind. Dir^t. Force. S.W. 1 / S.W. 3	—

AUGUST 17, 1873.

3	50 14 N.	15 49 W.	29·80	60	—	q	Heavy Wly.
4	40 22	69 47	30·05	—	—	t l r	—
5	35 24	7 19	—	—	—	—	—
6	42 47	60 18	—	—	—	m	Smooth.
7	48 51	42 18	30·29	—	—	—	
8	41 11	64 57	? 30·05	—	—	c	Wly.
22	38 28	63 15	—	—	—	fine	—
26	54 51	18 54 E.	? 30·24	80	—	fine	—
31	48 47	36 26 W.	—	—	—	c	Wly.
33	50 53	15 33	29·88	59	60	o r	—
34	40 36	68 55	30·03	70	68	o	—
35	52 1	6 50	30·13	59	58	o	—
36	41 48	65 4	30·07	69	69	f	—
37	51 3	19 46	29·87	60	59	c	Heavy Wly.
40	51 17	35 53	—	—	—	clear	—
42	37 26	13 1	—	—	—	c	—
44	13 47	17 54	30·01	—	—	c	—
45	45 48	7 51	30·31	73	—	c	Heavy W.S.Wly. swell.
46	25 57	39 4	30·21	80	—	c b	—
47	37 24	33 35	—	75	—	fine	—
53	9 49	81 13	29·95	—	—	o	—
54	18 30	66 9	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
56	42 41 N.	52 19 W.	30·18	74	73	fine	—
57	50 51	18 57	29·90	60	61	q r	Heavy Wly.
61	42 37	59 24	29·98	69	69	fine	Smooth.
65	51 50	8 17	30·00	—	—	q	—
71	49 20	65 36	29·65	55	51	c	—
73	50 55	57 57	29·69	57	54	m	—
74	49 11	66 58	? 29·61	—	—	fine	—
75	50 25	17 12	—	—	—	q p	—
76	36 58	55 20	—	—	—	fine and clear	—
77	24 25	95 0	? 29·91	87	—	fine and clear	—
78	37 20	73 29	30·09	80	—	p	—
84	49 30	8 10	—	66	—	c	—
86	33 40	57 56	—	—	—	p	—
87	15 45	36 40	—	—	—	o	—
97	50 34	21 23	29·90	60	58	q	Heavy Wly.
98	49 16	28 2	30·24	61	61	c	—
99	40 37	69 45	29·95	72	70	r t l	—
100	42 0	57 30	30·12	72	70	m	—
101	40 31	70 35	? 30·13	68	68	clear	—
102	51 1	20 45	—	—	—	c	—
103	50 13	37 31	—	—	—	g	—
105	Cow Bay, N.S.		—	—	—	—	—
108	43 39	62 45	—	—	—	f	—
109	39 54	49 8	—	—	—	fine	—
110	19 43	39 30	—	80	—	clear	—
113	Camercons River, W.C. Africa		—	—	—	r	—
132	7 18	25 9	—	—	—	m	—
133	0 45	31 27	—	—	—	clear	—
135	17 59	21 11	—	—	—	m	—
136	35 6	15 20	—	—	—	m	N.Ely.
139	12 46	28 27	—	—	—	fine	—
142	22 29	61 30	—	—	—	clear	—
146	46 3	55 4	—	—	—	f	—
148	46 20	58 0	—	—	—	m	—
149	46 57	50 7	—	—	—	f	—
152	4 23	7 8 E.	—	—	—	r	—
154	52 21	5 52 W.	—	—	—	c r	—
155	15 50	17 50	—	—	—	c p	—
156	16 32	17 45	—	—	—	fine	—
158	3 12	20 4	—	—	—	clear	—
159	51 8	22 1	? 29·96	56	57	—	High.
162	18 54	74 35	—	—	—	very hot	—
164	Sydney, Cape Breton		—	—	—	c	—
166	28 22	36 44	—	—	—	clear	—
167	7 24	23 16	—	—	—	clear	—
168	51 52	37 47	—	—	—	fine and clear	—
169	54 33	5 20	? 29·96	56	—	c r	—
171	27 18	69 5	—	—	—	clear	—
172	55 15	17 10	29·61	—	—	c	Heavy.
174	50 28	1 10	30·26	69	64	b	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
175	50 0 N.	4 0 W.	30·21	65	62	c b m	Smooth.
178	51 31	1 0 E.	29·96	65	65	v c b	—
179	31 9	40 21 W.	30·16	76	78	b c	Short N.Ely.
181	39 54	50 10	30·21	78	77	b	Smooth.
182	49 17	65 24	29·58	60	55	c b	—
183	21 32	83 57	30·05	85	85	b c	—
184	66 29	2 25	29·30	48	50	c q p	Heavy cross.
185	34 49	37 26	30·25	80	75	b c p	E.S.Ely. swell.
187	31 49	68 49	30·22	82	81	b	N.Wly. swell.
189	28 45	64 31	30·21	82	82	c b	S.E. swell.
190	48 3	32 31	30·29	61	61	f	Rather rough N.W.
192	56 21	16 0	29·53	59	55	b c g m	Rather rough W.N.Wly.
193	68 20	8 49 E.	29·48	58	55	c	Heavy W.N.Wly. swell.
194	Arsuk Fiord, Greenland		29·81	44	—	f	—
197	48 27	8 7 W.	30·23	62	64	c p	Smooth.
200	48 59	27 39	30·21	63	60	b c	Moderate.
202	1 30	20 5	30·08	77	78	b c	S.Ely. swell.
203	2 28	22 1	30·09	79	79	b c	Moderate Sly.
204	1 1	17 7	30·10	79	76	b c	Slight S.S.Ely. swell.
205	2 7	20 20	30·05	77	78	c b v	Smooth.
206	37 10	11 43 E.	30·16	81	81	b c	Calm.
209	2 10	24 7 W.	30·05	78	79	b c	Strong S.S.W. swell.
210	53 45	56 30	29·55	72	54	— —	—
216	6 45	16 40	30·04	79	79	c b	Smooth.
224	20 32	32 58	30·14	76	75	b c	—
225	8 19	21 47	30·00	79	78	b c q p	—
227	Colinet Harbour, N.F.		30·02	55	57	o f r	—
228	Halifax, N.S.		29·94	65	—	o f	*See* 248.
231	Gibraltar		30·12	—	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	89	—	b	—
233	Cape Coast Castle, W.C. Africa		30·07	75	—	o	*See* 257.
234	27 21	69 18	30·16	82	—	b c	—
236	50 58	7 43	30·02	63	—	b c	*See* 237 and 270.
237	50 58	7 40	29·93	62	—	o q	—
238	Holyhead		30·06	60	—	c	*See* 256 and 265.
240	Port of Spain, Trinidad		29·97	83	—	b c	—
242	Gibraltar		30·13	81	—	b c	—
243	Port Royal, Jamaica		30·00	80	—	b c	*See* 250.
245	Port Cortez, Honduras		29·98	80	—	b c	—
247	Gibraltar		—	—	—	b c q	—
248	Halifax, N.S.		29·92	66	—	o f	—
250	Port Royal, Jamaica		29·96	80	—	b c	—
253	2 57	7 32	—	—	—	b c	—
254	Axim Bay, W.C. Africa		30·09	81	—	b c	—
256	Holyhead		30·10	62	—	c p q	—
257	Cape Coast Castle, W.C. Africa		30·05	74	—	c	—
259	Gibraltar		30·17	81	—	b c	—
261	Holy Island, N. E. Coast Eng.		29·93	60	—	b c q	—
263	1 20	3 58 E.	30·04	80	—	b c	—
265	Holyhead		30·05	66	—	o	—
266	43 34	63 25 W.	30·04	65	64	f	—
267	27 22	69 14	30·19	82	83	b c	—
268	50 55	55 50	29·82	60	—	c	—
269	Gibraltar		30·07	81	—	b c q	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
270	51 0 N.	7 35 W.	30·04	66	—	c g m	—
274	42 0	26 15	—	—	—	fine	—
277	54 46	18 46	—	—	—	c	—
278	57 55	46 30	29·84	50	48	o m d	S.W. and N.W.
279	Nassau, New Providence		30·11	83	84	b	Smooth.
281	42 30	33 25	—	—	—	fine	—
288	17 30	67 55	—	83	84	b	—
293	Gaboon River, W.C. Africa		29·97	81	—	—	—
						Wind. Dir't. Force.	
	11 A.M. } St. Louis, Senegal {		29·90	81	—	S.E. 3	—
	2 P.M. }		29·90	80	—	S.W. 2	—

AUGUST 18, 1873.

3	49 17 N.	16 27 W.	29·96	60	—	c	Very heavy.
4	41 21	64 28	30·27	—	—	clear	—
5	55 15	14 48	29·88	57	57	o q	—
6	44 30	55 58	—	—	—	f	Smooth.
7	46 53	47 45	30·24	57	54	f	Smooth.
8	40 51	68 25	? 30·24	68	71	clear	—
22	40 0	59 13	—	—	—	fine	—
26	33 23	23 46 E.	? 30·14	77	—	fine	—
31	48 29	41 12 W.	—	—	—	m	—
33	51 51	7 45	29·60	59	59	clear	—
34	41 56	62 8	30·25	71	65	clear and fine	—
35	50 41	12 3	30·12	57	57	q	—
36	40 50	71 10	30·20	62	—	d m	Smooth.
37	50 21	26 7	30·28	60	56	fine	—
40	52 21	38 58	—	—	—	f	—
42	49 29	10 46	—	—	—	fine and clear	—
44	10 30	17 21	30·00	—	—	b c	—
45	42 41	10 7	30·14	72	—	b c	—
46	27 55	39 15	30·20	81	—	fine	—
47	39 15	34 8	—	74	—	fine	—
53	9 22 Colon	79 54	29·92	—	—	b c	—
54	17 55	66 28	—	—	—	fine	—
56	41 47	38 41	30·19	70	74	c	—
57	59 7	23 34	30·25	61	59	c	Smooth.
61	42 34	55 21	30·20	63	62	fine	Smooth.
65	51 23	14 8	29·80	63	61	—	Short confused.
71	50 17	58 42	30·17	59	58	fine	—
73	49 3	61 50	30·14	—	—	b	—
74	49 16	61 0	? 30·08	60	58	fine	—
75	50 42	13 5	—	—	—	q r	—
76	39 3	52 33	—	—	—	c	Heavy.
77	27 1	90 53	? 29·98	71	—	clear	—
78	38 21	69 35	30·19	81	—	c	—
82	1 4	38 11	30·08	82	—	—	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
84	49 7 N.	12 43 W.	—	62	—	q	—
86	33 0	57 0	—	—	—	clear	—
87	17 20	38 48	—	—	—	q r	—
97	49 57	28 49	30·31	60	60	clear	—
98	48 7	33 4	30·41	63	62	c	—
99	41 9	63 52	30·27	67	69	clear	—
100	41 39	62 39	30·18	70	66	clear	—
102	51 28	11 29	—	—	—	c	Heavy W.N.Wly.
103	51 47	41 4	—	—	—	f	—
105	Cow Bay, N.S.		—	—	—	fine	—
108	42 59	63 29	—	—	—	fine	—
109	40 26	49 7	—	—	—	c	—
110	21 58	40 35	—	80	—	clear	—
113	3 45	9 25 E.	—	—	—	m	—
117	20 50	60 20 W.	—	—	—	—	Heavy E.S.E.
132	10 37	23 34	—	—	—	m r	—
133	4 26	30 7	—	—	—	c	—
135	21 26	19 59	—	—	—	m	—
136	38 15	14 8	—	—	—	clear	—
139	12 30	28 25	—	—	—	fine	—
142	24 5	63 10	—	—	—	clear	—
146	46 38	58 11	—	—	—	clear	—
148	46 35	53 39	—	—	—	fine	—
149	47 16	53 7	—	—	—	f	—
151	10 24	16 36	—	—	—	fine	—
152	Bonny, W. C. Africa		—	—	—	r	—
155	19 43	17 54	—	—	—	fine	—
156	12 54	17 32	—	—	—	c	—
158	1 33	22 2	—	—	—	fine and clear	—
159	50 34	25 53	30·34	56	56	fine	—
162	18 50	74 35	at 5 P.M. 30·02	—	—	c	—
163	49 15	64 20	—	—	—	clear	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	29 55	36 21	—	—	—	fine	—
167	6 25	24 25	—	—	—	clear	—
168	52 54	41 30	—	—	—	f	—
171	27 54	60 55	—	—	—	—	Heavy N.N.W.
172	54 45	23 10	30·10	—	—	clear	Heavy.
179	33 35	39 16	30·33	77	77	b c	Short N.Ely.
181	40 52	49 27	30·22	79	77	m b	E.S.Ely. swell.
182	47 30	60 35	30·27	64	63	fine	—
183	21 34	84 55	30·10	86	84	b c	Smooth.
184	64 17	0 52	29·83	56	52	fine	Heavy W.N.Wly. swell.
185	36 37	36 42	30·40	80	73	b c	Moderate.
187	32 35	69 34	30·22	81	81	b	Smooth.
189	25 0	64 36	30·05	85	82	c b	Ely. swell.
190	46 31	39 1	30·48	69	66	c b	Very smooth.
192	56 26	23 49	30·11	57	55	b c	Slight N.Wly.
193	70 2	14 36 E.	29·97	57	55	d m	Strong E.N.Ely.
194	Frits Harbour, Greenland		29·51	45	—	o t l	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
197	47 39 N.	9 30 W.	29·81	64	66	o	Very heavy cross.
200	47 10	34 6	30·48	70	64	c	Gentle W.N.Wly.
203	0 0	24 15	30·03	77	77	b c	Moderate S.S.E.
206	36 51	12 22	30·11	81	81	b	Very smooth.
208	51 20	4 50	29·63	65	62	b e p q	Short N.Wly.
210	53 45	56 30	30·13	56	—	c	—
216	6 13	16 0	30·02	79	79	c b	Smooth.
224	22 0	34 40	30·12	77	75	b c	—
225	10 59	22 47	29·98	77	77	o r	—
227	46 55	53 40	30·17	60	60	b c	—
228	Halifax, N.S.		30·29	63	—	b c	—
231	Gibraltar		30·02	77	—	b c	*See* 242, 247, 259, and 269.
232	Malaga, S. Spain		—	86	—	b c	—
233	Cape Coast Castle, W. C. Africa		30·05	76	—	b c	*See* 257.
234	28 29	68 13	30·13	84	78	b c	—
236	51 18	9 18	29·53	67	—	c q	—
237	51 27	7 55	29·46	65	—	b c	—
238	Holyhead		29·57	69	—	o r	*See* 256 and 265.
239	Keyham, Eng. Chan.		—	—	—	b c	—
240	Port of Spain, Trinidad		30·02	78	—	b e p	—
242	Gibraltar		30·07	80	—	b c	—
243	Port Royal, Jamaica		29·98	80	—	b c l	*See* 250.
245	Port Cortez, Honduras		29·98	80	—	b c	—
247	Gibraltar		30·03	79	—	b c	—
248	44 35	63 35	30·31	65	—	b c	—
250	Port Royal, Jamaica		30·00	80	—	c l t	—
253	3 54	4 40	29·98	76	—	b c	—
254	Axim Bay, W. C. Africa		30·08	82	—	b c	—
255	Spithead		—	—	—	ø d	—
256	Holyhead		29·61	62	—	c	—
257	Cape Coast Castle, W. C. Africa		30·03	75	—	c	—
259	Gibraltar		30·03	79	—	b c	—
261	Holy Island, N. E. Coast Eng.		29·59	56	—	o r	—
263	1 7	1 48 E.	30·00	78	—	b c	—
265	Holyhead		29·60	68	—	b c	—
266	42 15	63 24 W.	30·33	68	68	b c	—
267	28 28	68 14	30·11	83	82	b c	—
268	49 50	53 30	30·12	62	—	b c	—
269	Gibraltar		29·95	80	—	b c	—
270	51 26	8 55	29·54	67	—	b c	—
274	42 15	24 5	—	—	—	o	—
277	53 30	22 5	—	—	—	fine	—
278	58 45	49 40	29·53	49	48	o m	Heavy N.W.
279	Nassau, New Providence		30·16	82	84	b	Smooth.
281	42 25	34 40	—	—	—	fine	Smooth.
285	9 50	78 55	30·00	83	82	o	—
288	17 20	70 30	—	80	82	b	—
293	Gaboon River, W. C. Africa		29·97	82	—	—	—
						Wknd. Dir. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·95 29·92	81 83	— —	S. 1 S.W. 3	— —

AUGUST 19, 1873.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	47 52 N.	17 33 W.	30·11	62	—	c p'	—
4	43 15	59 49	30·54	—	—	clear	—
5	54 48	22 16	29·79	57	55	o m	—
6	46 45	52 7	—	—	—	m	Smooth.
7	45 2	53 5	30·27	60	59	f	—
8	40 40	71 57	—	70	72	fine	—
22	41 14	55 20	—	—	—	—	Heavy E.N.Ely.
26	31 37	28 31 E.	?30·00	80	—	fine	—
31	47 41	45 39 W.	—	—	—	c	—
34	43 32	56 2	30·26	65	65	m	—
35	49 27	17 58	30·01	61	59	m	Smooth.
37	49 28	33 35	30·20	62	59	c m	—
40	52 57	40 29	—	—	—	—	—
42	43 51	9 8	—	—	—	fine and clear	Heavy N.W.
44	7 51	15 25	30·06	—	—	d	—
45	38 51	11 37	30·09	73	—	c	N.N.Ely.
46	30 14	39 43	30·24	80	—	c	—
47	40 46	33 50	—	76	—	fine	—
50	48 52	5 54	29·83	—	—	q	Heavy W.N.W. swell.
53	Colon		—	—	—	b c	—
	9 22	79 54					
54	18 10	65 40	—	—	—	fine	—
56	41 5	65 21	30·16	76	79	fine	—
57	49 12	29 55	30·23	65	61	o	W.S.Wly.
61	42 20	70 34	—	—	—	f	—
65	50 44	21 35	29·97	63	63	o	—
71	52 39	52 1	30·34	52	49	fine and clear	—
73	48 58	67 11	30·16	54	—	m	—
74	51 36	56 10	?30·20	57	56	fine and clear	—
75	51 5	4 42	—	—	—	q	—
76	41 9	49 36	—	—	—	c	Heavy.
78	39 9	65 47	30·18	82	—	fine	—
82	2 41	40 39	30·04	83	—	fine	—
84	48 25	17 22	—	65	—	—	Heavy.
86	33 30	55 53	—	—	—	fine	—
87	19 4	40 18	—	—	—	g m q	—
97	47 58	36 25	30·26	61	59	m	—
98	46 41	39 9	30·32	67	65	f	—
99	41 44	58 2	30·18	72	73	c	—
100	40 55	67 55	30·15	72	65	c	—
102	53 28	4 7	—	—	—	d	—
103	51 14	43 15	—	—	—	g	—
105	Cow Bay, N.S.		—	—	—	fine and sultry	—
108	43 30	66 15	—	—	—	f	—
109	42 8	48 5	—	—	—	c	—
110	24 40	42 10	—	80	—	c	—
113	Fernando Po, W. C. Africa		—	—	—	o p	—
115	24 50	63 10	—	—	—	—	—
116	25 45	63 20	—	—	—	—	—
117	20 10	59 45	—	—	—	—	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
132	13 43 N.	22 2 W.	—	—	—	fine	—
133	8 6	28 20	—	—	—	c	—
135	24 37	18 47	—	—	—	—	Short N.N.Ely.
136	41 5	12 17	—	—	—	—	Heavy Nly. swell.
139	11 45	27 46	—	—	—	—	S.Ely.
142	25 40	63 40	—	—	—	clear	—
146	47 26	60 5	—	—	—	fine	—
148	46 55	49 30	—	—	—	m	—
149	46 29	53 33	—	—	—	m	—
151	13 41	17 55	—	—	—	m	—
155	23 23	17 18	—	—	—	fine	—
156	9 42	16 9	—	—	—	m r	—
159	50 5	30 8	? 30·20	60	59	m	—
162	19 30	73 40	—	—	—	very hot	—
164	Sydney, Cape Breton		—	—	—	f	—
166	31 53	36 41	—	—	—	fine	—
167	5 2	24 59	—	—	—	clear	—
168	52 31	42 20	—	—	—	clear	—
171	29 42	61 55	—	—	—	clear	—
172	54 0	28 15	—	—	—	o	Heavy.
179	55 24	39 0	30·37	76	75	b c	Short N.Ely.
181	42 22	48 4	30·26	72	64	o f d	S.S.E. swell.
183	22 27	85 1	30·07	86	84	b c	Smooth.
184	63 3	2 8	29·61	55	52	m	Heavy confused.
185	37 50	36 31	30·43	82	—	b	Smooth.
187	33 37	70 25	30·18	82	81	b	Smooth.
189	21 22	64 53	29·94	84	82	b c	Very heavy swell.
190	44 47	44 52	30·40	72	70	c b	Smooth.
192	56 22	30 55	29·68	53	53	c g m q d	Very high Wly.
194	Ivigtut, Greenland		29·97	45	—	b	—
197	43 55	10 40	30·14	65	—	c	Light W.N.W.
200	44 52	40 25	30·40	77	70	c	Smooth.
206	36 32	13 24 E.	30·04	81	80	b	Very smooth.
208	50 18	6 12 W.	29·77	63	62	b c p	Short heavy N.Wly.
210	53 45	56 20	30·17	59	—	b	—
216	5 50	14 24	30·05	81	80	b c	Smooth.
221	Spithead		29·64	60	—	b c	*See* 255.
224	23 43	36 0	30·17	77	75	b c	—
225	13 52	23 42	30·00	80	—	b c	—
227	Trepassey Hr., N.F.		30·34	56	58	o	—
228	Halifax, N.S.		30·24	64	—	o	—
231	Gibraltar		29·96	76	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	90	—	b m	—
234	29 24	67 39	30·20	84	78	b c q	—
236	51 13	9 26	29·79	64	—	b c	*See* 237 and 270.
237	51 15	9 18	29·69	65	—	b c	—
239	Keyham, Eng. Chan.		—	—	—	b c	—
240	Trinidad		29·99	80	—	b c	—
242	Gibraltar		29·95	78	—	b q	—
243	Port Royal, Jamaica		29·99	79	—	b c	*See* 250.
244	Secondee, W.C. Africa		30·06	82	—	b c	—
245	Omoa, Honduras		30·04	80	—	o p	—
247	Gibraltar		29·99	76	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
248	43 8 N.	66 5 W.	30·14	58	54	o m	—
250	Port Royal, Jamaica		29·99	78	—	b c	—
253	4 45	2 55	30·00	78	—	b c	—
255	Spithead		—	—	—	b c	—
257	Elmina, W.C. Africa		30·05	75	—	b c	—
259	Gibraltar		29·99	77	—	b c	—
263	1 17	0 8 E.	29·99	80	—	b c	—
266	40 51	64 31 W.	30·33	74	72	b c	—
267	29 25	67 30	30·10	83	83	b c	—
268	St. John's, N.F.		30·37	62	—	f	—
269	Gibraltar		29·89	80	—	b c	—
270	51 15	9 23	29·80	68	—	b c q	—
274	42 32	21 36	—	—	—	clear	—
277	53 50	24 15	—	—	—	o m	—
278	58 50	30 0	30·03	50	47	b c	Short chopping W.
279	Nassau, New Providence		30·11	82	84	b c	Smooth.
281	42 35	35 40	—	—	—	fine	—
285	15 25	58 20	30·00	81	82	b c	—
288	17 18	72 50	—	82	84	b	—
290	3 20	19 10	—	79	—	—	—
293	Gaboon River, W.C. Africa		29·93	82	—	—	—
						Wind. Dirc. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·94 / 29·97	85 / 76	—	W.N.W. 2 / S. 2	—

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3	45 49 N.	18 27 W.	29·99	66	—	r	—
4	45 31	54 56	30·20	—	—	f	—
						o	W.S.Wly.
5	53 50	27 43	29·90	54	54	c	Smooth.
6	48 55	48 3	—	—	—	f	—
7	43 33	58 32	30·12	—	—	—	—
22	42 26	51 55	—	—	—	fine	—
26	31 12	29 52 E.	? 29·97	82	—	fine	—
31	46 41	49 20 W.	—	—	—	f	—
34	45 47	49 28	30·20	61	59	f	—
35	48 53	33 8	30·01	61	60	c	—
37	47 59	41 0	30·29	59	63	o g	—
40	51 16	42 12	—	—	—	—	—
42	47 2	6 27	—	—	—	c p	—
44	4 52	12 22	30·04	—	—	c	High S.S.Wly.
45	35 2	12 53	30·14	72	—	c	N.N.Ely.
46	32 8	40 32	30·24	80	—	fine	—
47	40 53	33 43	—	75	—	fine	—
50	46 3	10 46	29·96	—	—	q o	—
53	Colon		29·97	—	—	b c	—
	9 22	79 54					
56	40 30	71 40	30·15	70	70	f	—
57	47 51	35 54	30·29	62	64	fine	S.Ely. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
59	51 49 N.	7 58 W.	—	—	—	fine	*See* 93.
65	49 43	28 5	30·03	62	64	—	W.S.Wly.
71	54 25	44 5	30·18	59	53	fine and clear	—
74	53 6	49 46	? 30·08	53	48	c	—
76	43 30	46 1	—	—	—	fine	—
78	39 52	62 10	30·14	79	—	fine	—
82	4 41	42 39	30·07	83	—	fine	Smooth.
84	47 32	21 57	—	65	—	c	—
86	34 30	53 30	—	—	—	fine	Heavy.
87	21 23	41 12	—	—	—	g	—
88	23 20	82 40	—	—	—	q p	—
93	51 59	7 30	—	—	—	m p	—
97	45 24	43 25	30·22	71	71	m	—
98	44 59	44 6	30·27	74	78	q r	—
99	42 27	51 58	30·15	74	74	clear	E.N.Ely.
100	40 33	73 20	30·09	69	70	c	—
103	50 55	44 26	—	—	—	g	—
108	44 30	66 40	—	—	—	f	—
109	43 7	46 13	—	—	—	fine	—
110	27 22	43 28	—	77	—	m	—
113	Bonny, W. C. Africa		—	—	—	p	—
116	25 50	63 40	—	—	—	—	—
121	33 40	64 20	—	—	—	—	Heavy S.S.E. swell.
123	35 0	71 15	? 30·20	—	—	—	—
127	38 20	68 30	—	—	—	—	—
129	38 40	67 0	—	—	—	—	—
132	16 31	20 46	—	—	—	c	—
133	11 12	26 47	—	—	—	clear	—
135	27 27	17 42	—	—	—	m	High, confused.
136	44 0	10 35	—	—	—	clear	Heavy Nly. swell.
139	11 0	27 0	—	—	—	clear	Heavy S.S.Wly.
142	27 22	64 45	? 29·90	—	—	q	Heavy N.Ely. sea. Heavy E.S.Ely. swell.
144	48 3	61 40	—	—	—	r m	Heavy S.S.Ely.
146	48 15	62 9	—	—	—	clear	—
148	47 0	45 45	—	—	—	m	—
149	45 20	54 46	—	—	—	f	—
151	17 25	17 59	—	—	—	fine	—
152	3 48	8 30 E.	—	—	—	c r	—
153	4 16	6 48	—	—	—	fine	—
155	26 9	16 18 W.	—	—	—	fine	Heavy.
156	Sierra Leone, W. C. Africa		—	—	—	fine	—
157	52 3	6 16	—	—	—	—	—
159	49 34	35 20	—	57	59	r	—
162	20 10	73 55	at 5 p.m. 29·99	—	—	very hot	—
163	48 8	62 5	—	—	—	r	—
164	Sydney, Cape Breton		—	—	—	p g	—
166	33 7	37 11	—	—	—	fine	—
167	3 25	26 18	—	—	—	clear	—
168	51 15	43 36	—	—	—	c g	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
171	31 17 N.	62 52 W.	—	—	—	—	—
172	52 50	32 20	30·02	—	—	clear	Heavy.
179	36 47	39 4	30·38	73	75	b c	Long W.N.Wly. swell.
181	43 23	45 50	30·29	77	74	b	Moderate S.S.Wly. swell.
182	46 6	60 11	—	—	—	m r	—
185	24 8	84 37	30·03	86	84	b c	Smooth.
184	61 29	1 43	29·65	59	54	fine and clear	Light swell.
185	38 22	36 30	30·40	74	76	b	Smooth.
187	34 26	70 58	30·16	81	80	b	Smooth.
190	42 39	49 45	30·21	73	72	f	Slight.
191	0 35	43 6	30·02	83	79	fine	Smooth.
192	55 40	35 55	30·00	53	52	b c m	Rather rough W.N.Wly.
194	Ivigtut, Greenland		29·90	45	—	b	—
197	42 7	11 26	30·14	69	68	o p	Slight N.W.
200	43 40	46 51	30·31	75	71	c b m	Long S.S.Wly. swell.
206	36 32	14 19 E.	30·05	83	80	b	Very smooth.
208	49 33	8 12 W.	29·74	64	65	o d q	—
210	53 45	56 20	30·17	50	—	o	—
216	4 36	13 54	30·05	82	79	c	Smooth.
224	25 21	36 59	30·30	77	75	o	—
225	16 17	24 36	29·99	80	—	b c m	—
227	Trepassey Harbour, N.F.		30·19	53	54	o m	—
228	Halifax, N. S.		30·05	67	—	o	—
231	Gibraltar		—	71	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	87	—	b c	—
233	Cape Coast Castle, W. C. Africa		30·03	79	—	b c	*See* 244, 254, 257, & 262.
234	30 30	66 47	30·10	85	78	b c q	Heavy S.Ely. swell.
236	51 32	9 58	29·57	62	—	b c	*See* 237 and 270.
237	51 20	9 57	29·52	60	—	b c	—
238	53 28	4 38	29·43	62	—	o d	*See* 258.
239	Keyham, Eng. Chan.		—	—	—	r	—
240	Trinidad		30·00	80	—	b c	—
242	Gibraltar		29·99	75	—	b c	—
243	Port Royal, Jamaica		29·97	82	—	b c	*See* 250.
244	4 53	1 45	30·03	82	—	b c	—
245	Omos, Honduras		29·97	80	—	b c	—
247	Gibraltar		30·01	76	—	b c	—
248	44 45	66 27	30·12	57	—	b c	—
250	Port Royal, Jamaica		29·93	80	—	b c	—
253	4 22	1 13	30·00	78	—	b c	—
254	Dix Cove, W. C. Africa		30·07	81	—	b c	—
255	Spithead		29·81	64	—	o q p	—
257	Elmina, W. C. Africa		29·98	76	—	b c	—
258	53 20	4 45	29·55	61	—	o p d	—
259	Gibraltar		30·00	73	—	b c q	—
262	Tacoradi Bay, W. C. Africa		29·96	77	73	b c	—
263	1 24	0 25	30·01	80	—	b c	—
266	39 26	65 16	30·18	80	81	b c	—
267	30 28	66 48	30·02	80	82	b c	—
268	St. John's, N.F.		—	—	—	o r	—
269	Gibraltar		29·94	73	—	b c	—
270	51 21	10 4	29·61	62	—	b c	—
274	43 36	19 25	—	—	—	p	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		*
277	53 15 N.	25 25 W.	—	—	—	c	—
278	60 20	50 0	30·01	46	—	b m	Short W.N.W.
279	Nassau, New Providence		30·02	82	84	b c m	Smooth.
281	42 55	36 55	—	—	—	fine	—
285	18 45	56 55	30·01	81	80	b c	—
288	17 35	74 0	—	83	85	b	—
290	4 30	19 10	—	79	—	—	—
293	Gaboon River, W. C. Africa		29·93	80	—	—	—
						Wind. Dir. Force.	
11 A.M. 2 P.M.	St. Louis, Senegal		29·90 29·86	84 84	—	W.N.W. 3 W.S.W. 3	—

AUGUST 21, 1873.

3	44 11 N.	20 14 W.	30·07	65	—	fine and clear	—
4	47 45	49 48	30·20	—	—	o	—
5	52 39	33 16	30·12	55	55	o	W.S.Wly.
6	50 56	43 1	—	—	—	c g	N.N.Ely.
7	41 59	64 3	30·14	—	—	clear	—
10	40 28	70 50	—	—	—	fine and clear	—
22	43 52	47 40	—	—	—	f	—
23	29 0	89 0	—	—	—	unsettled	—
31	45 32	53 26	—	—	—	r	—
34	48 23	42 50	30·07	56	59	o	—
35	48 13	29 21	30·00	60	59	m	—
37	46 15	48 18	30·11	56	57	f p	—
39	46 35	72 3	—	—	—	clear	—
40	51 5	44 18	—	—	—	c	—
44	2 32	10 21	30·08	—	—	b c	—
45	31 30	14 0	30·11	73	—	c	—
46	33 39	40 56	30·24	80	—	c	—
47	41 23	31 50	—	74	—	fine	—
50	43 19	15 10	29·95	—	—	b c	—
53	Colon 9 22	79 54	29·96	—	—	b c	—
54	St. Thomas, W. I.		—	—	—	fine	*See* 189.
57	26 3	41 48	30·10	69	73	c	Smooth.
59	53 13	14 2	29·80	—	—	fine	Heavy Wly.
65	48 21	35 20	30·02	64	67	r	Smooth.
66	40 29	70 38	30·12	74	76	f	—
71	55 47	35 27	29·80	50	52	c	—
74	54 24	43 2	? 30·05	49	50	c	—
76	45 16	41 58	—	—	—	r	—
77	27 4	86 34	? 29·97	78	—	o	—
78	40 33	58 45	30·14	78	—	fine	—
82	6 23	43 38	30·09	85	—	c	—
84	46 39	27 10	—	67	—	c	—
85	35 39	50 52	—	—	—	g p	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
87	23 44 N.	42 13 W.	—	—	—	o	—
88	24 0	81 30	—	—	—	g	—
93	50 59	13 25	29·74	61	63	clear	High.
97	45 1	50 9	—	71	70	f	—
98	43 40	49 27	30·06	68	61	f	—
99	44 47	45 13	30·06	71	67	f	—
103	50 52	46 52	—	—	—	clear	—
109	43 24	43 14	—	—	—	p	—
110	29 25	43 43	—	83	—	clear	—
113	4 55	4 47 E.	—	—	—	c	—
116	26 30	64 5 W.	—	—	—	—	—
118	30 0	66 0	? 29·20	—	—	—	—
121	32 19	64 45	—	—	—	—	—
123	34 0	71 15	? 29·95	—	—	r	Heavy S.E. swell.
126	36 30	68 0	? 30·10	—	—	—	S.E. swell.
129	39 20	65 30	—	—	—	—	—
132	18 0	20 18	—	—	—	clear	—
133	14 23	26 9	—	—	—	clear	—
135	30 13	16 24	—	—	—	clear	High N.N.Ely.
136	47 29	8 40	—	—	—	c	Heavy swell.
139	9 26	27 1	—	—	—	c	—
142	28 5	65 30	? 29·40	—	—	—	Frightful Ely.
146	48 55	64 5	—	—	—	clear	—
148	47 0	41 30	—	—	—	c g	—
149	45 18	55 15	—	—	—	f	—
150	1 13	28 27	—	—	—	clear	—
151	21 8	17 41	—	—	—	clear	—
152	Old Calabar, W. C. Africa		—	—	—	p	—
153	Lagos, W. C. Africa		—	—	—	c	Heavy S.S.W. swell.
155	27 43	15 20	—	—	—	moderating	Heavy.
156	7 23	13 20	—	—	—	p	—
157	48 53	8 57	—	—	—	—	Falling.
159	48 53	40 52	? 30·13	59	59	fine	Smooth.
162	20 10	74 0	—	—	—	fine	—
163	47 32	59 55	—	—	—	r	—
164	Sydney, Cape Breton		—	—	—	m	—
166	34 33	37 16	—	—	—	fine	—
167	1 57	28 0	—	—	—	clear	—
168	50 57	45 10	—	—	—	clear	—
171	33 22	63 11	—	—	—	clear	—
172	50 53	37 15	30·17	—	—	clear	Heavy.
178	Yarmouth Roads		29·81	66	64	c	—
179	37 27	39 13	30·32	76	75	b c	Smooth.
181	43 56	43 25	30·10	74	72	o r	Moderate.
182	46 22	57 44	30·07	62	62	m r	—
183	23 56	83 16	30·02	84	83	o	Smooth.
184	59 54	0 32	29·73	56	54	c	Smooth.
185	38 26	36 31	30·33	80	77	b	Smooth.
187	35 36	72 2	30·16	81	81	b	Sly. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
189	St. Thomas, W. I.		30·06	84	83	b	Nly. swell.
190	41 58 N.	56 52 W.	30·11	73	73	b f	Rather rough E.S.E.
192	54 38	43 2	30·00	48	49	o q u	Rather rough N.Wly.
194	Ivigtut, Greenland.		29·86	43	—	b	—
197	40 4	13 10	30·10	70	69	b c	Nly. swell.
200	42 49	53 15	30·10	77	78	c	Light S.S.Ely.
206	36 6	15 14 E.	30·07	81	81	b c	Smooth.
208	48 30	9 15 W.	29·90	68	66	b c	Long W.N.Wly. swell.
210	53 45	36 20	30·29	55	50	b	—
216	3 10	14 46	30·05	78	78	b c	Smooth.
224	26 28	37 50	30·24	77	74	b c	—
225	Porto Grande, St. Vincent		29·95	82	—	b c	—
227	Trepassey Harbour, N. F.		30·15	56	56	c	—
228	Halifax, N.S.		30·18	62	—	o	—
231	Gibraltar		30·03	74	—	b	*See* 242, 247, 259, and 269.
232	Malaga, S. Spain		—	83	—	b c	—
233	Cape Coast Castle, W.C. Africa		30·06	75	—	b c	*See* 244, 253, 254, 257, and 262.
234	31 31	66 33	29·98	82	79	c q	Heavy.
236	51 31	10 0	29·68	60	—	c q	*See* 237 and 270.
237	Entrance of Bantry Bay		29·61	58	—	c	—
238	52 2	5 33	29·74	60	—	b c	—
239	Keyham, Eng. Chan.		—	—	—	r	—
240	Trinidad		30·01	80	—	b c	—
242	Gibraltar		30·05	78	—	b c	—
243	Port Royal, Jamaica		29·98	79	—	b c	*See* 250.
244	Secondee, W. C. Africa		30·08	80	—	b c	—
245	Omoa, Honduras		29·97	80	—	b c	—
247	Gibraltar		30·04	75	—	b c	—
250	Port Royal, Jamaica		29·93	82	—	b c	—
253	4 44	1 36	—	—	—	b c m	—
254	4 44	1 49	30·09	81	—	b c	—
255	Spithead		29·87	65	—	b c p q	—
256	51 27	5 53	29·81	63	—	b c	*See* 258 and 265.
257	Elmina, W. C. Africa		30·05	75	—	b c	—
258	51 27	5 53	29·79	64	—	b c p q	—
259	Gibraltar		30·02	78	—	b c	—
260	0 28	10 10	30·17	75	73	b	—
261	Holy Island, N.E. Coast Eng.		29·50	59	—	o r	—
262	Dix Cove, W. C. Africa		29·99	77	71	b c	—
263	0 47	0 11	30·08	82	—	b c	—
265	51 27	5 51	29·81	66	—	b c	—
266	38 8	66 36	30·23	79	80	b c	—
267	31 12	66 25	29·93	80	82	c q	—
268	St. John's, N. F.		30·19	60	—	o q	—
269	Gibraltar		—	—	—	b c	—
270	51 29	10 1	29·70	64	—	o p	—
271	1 39	28 28	—	—	—	fine and dry	—
272	0 41	27 49	—	—	—	fine and clear	—
274	45 0	16 57	—	—	—	clear	—
276	40 5	73 10	—	—	—	fine	—
277	51 55	28 15	—	—	—	c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
278	61 30 N.	48 50 W.	29·93	39	36	b c	Short N.W.
279	Nassau, New Providence		30·07	84	83	b	Smooth.
281	44 30	38 10	—	—	—	c	—
285	20 25	53 40	30·08	82	81	c b r	—
288	18 0	75 15	—	84	86	b c p	—
290	5 48	18 48	—	79	—	—	—
292	14 56	17 56	—	84	—	—	—
293	Gaboon River, W.C. Africa		29·97	82	—	—	—
						Wind. Dir°. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·91 29·85	85 84	— —	N.W. 1 S.W. 2	— —

AUGUST 22, 1873.

3	43 53 N.	21 36 W.	30·04	69	—	fine and clear	—
4	50 5	44 22	30·27	—	—	c	—
5	51 15	38 55	30·33	51	52	c	W.S.Wly.
6	52 22	36 52	—	—	—	o	High N.Wly.
7	40 54	69 35	30·08	—	—	c	—
9	55 20	14 23	29·88	—	—	fine and pleasant	—
10	41 18	66 29	—	—	—	clear	—
22	45 15	43 31	—	—	—	r	Heavy.
23	26 39	86 3	—	—	—	p	—
31	46 57	58 33	—	—	—	clear	—
32	51 48	8 16	29·80	60	—	fine	*See* 94.
34	49 45	35 7	30·18	57	59	c b	N.Wly.
35	47 17	36 13	30·21	60	62	fine and clear	—
37	44 21	55 11	30·02	62	61	g o	—
40	50 36	45 43	—	—	—	clear	—
44	0 55	8 38	30·13	—	—	b c	—
45	27 42	15 25	30·12	73	—	c	—
46	35 10	39 36	30·23	79	—	c	—
47	42 27	29 5	—	74	—	c	—
50	40 28	19 37	30·16	—	—	c	—
53	11 55	79 3	29·96	—	—	b c	—
54	St. Thomas, W.I.		—	—	—	fine	—
57	44 8	47 35	30·01	71	71	d	—
59	50 27	21 18	29·78	59	60	q	High Wly.
65	46 17	43 9	30·12	68	70	o	—
66	40 48	64 42	30·11	74	76	clear	—
70	55 10	7 2	? 29·70	66	—	clear	—
71	56 15	26 35	29·66	51	54	q p	—
74	55 34	35 44	? 30·00	51	52	c	—
76	46 38	37 43	—	—	—	fine	—
77	24 15	82 10	? 29·95	81	—	—	—
78	41 19	54 36	30·05	77	—	fine	—
82	7 26	44 45	30·08	86	—	fine	Smooth.
84	45 56	32 48	—	69	—	c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
86	37 20 N.	50 15 W.	—	—	—	clearing up	Heavy.
87	25 19	42 47	—	—	—	fine	—
88	25 45	79 30	—	—	—	c	—
93	50 10	19 58	29·73	61	61	p	—
94	51 53	7 46	—	—	—	c	—
97	41 55	57 9	29·97	68	69	c	—
98	42 17	54 33	29·97	74	75	clear	—
99	46 59	40 36	30·17	64	72	c	—
101	40 24	70 50	? 30·18	74	—	fine and clear	—
103	49 38	48 14	—	—	—	clear	—
109	44 1	42 18	—	—	—	c	—
110	30 5	43 22	—	82	—	clear	—
113	Lagos, W.C. Africa		—	—	—	c	Heavy. *See* 153.
123	34 0	70 0	? 29·63	—	—	—	Heavy cross.
126	34 45	67 10	? 29·90	—	—	n in S.E.	—
127	35 40	66 20	—	—	—	—	Heavy S.E.
129	38 50	64 10	—	—	—	—	—
130	35 10	73 20	? 30·05	—	—	—	—
132	19 50	19 35	—	—	—	m	—
133	St. Vincent		—	—	—	m	—
135	33 13	14 49	—	—	—	clear	Smooth.
136	50 58	6 13	—	—	—	clear	—
139	8 2	26 14	—	—	—	q	—
142	29 15	65 40	—	—	—	—	Fearful.
146	49 21	65 48	—	—	—	clear	—
148	46 35	37 15	—	—	—	fine	—
149	46 11	38 52	—	—	—	clear	—
150	3 22	28 43	—	—	—	sultry	—
151	24 28	17 1	—	—	—	—	Strong Nly.
152	Old Calabar, W. C. Africa		—	—	—	r o	—
153	Lagos, W.C. Africa		—	—	—	clear	Considerable W.S.W. swell.
155	28 30	16 55	—	—	—	fine	—
156	6 4	10 41	—	—	—	fine	—
157	45 6	10 23	—	—	—	c	—
159	47 34	46 28	? 30·21	56	54	g r	—
162	19 47	74 18	5 P.M. 30·01	—	—	fine	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	34 55	37 1	—	—	—	g	—
168	50 0	47 13	—	—	—	c	—
171	35 20	62 51	—	—	—	—	—
172	49 16	42 46	30·20	67	64	clear	Heavy N.N.Wly. swell.
178	Newcastle, Eng.		29·75	58	59	c p	—
179	38 12	38 35	30·26	76	75	b c	Smooth.
181	43 53	41 53	30·09	73	73	o	Short E.N.E.
182	46 31	54 14	30·08	57	59	c	Smooth.
183	23 30	81 55	30·05	84	84	b c	—
184	57 45	1 50	29·70	56	54	c	Smooth.
185	38 44	35 50	30·31	80	75	b	Smooth.
187	37 29	72 50	30·10	79	79	b	Heavy increasing S.S.Ely. swell.
189	21 37	64 58	30·08	82	82	b	Nly. swell.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
190	41 11 N.	62 58 W.	30·17	69	78	f	Rough E.S.E.
192	53 14	49 42	30·09	51	50	b c m	Slight S.Wly.
194	Ivigtut, Greenland		29·67	42	—	f r	—
197	37 50	14 10	30·22	71	70	b c	Smooth.
200	42 11	59 25	30·12	69	69	o g p	Long S.S.Ely. and S.S.Wly.
206	35 36	17 3 E.	30·03	84	82	b	Smooth.
208	47 46	9 4 W.	29·98	67	64	b c	Long W.N.Wly. swell.
210	53 50	56 50	29·89	69	50	—	—
216	2 50	17 10	30·03	78	79	b m	Smooth.
224	27 24	38 14	30·26	77	74	b c	—
225	18 10	23 45	30·01	80	—	o r	—
227	Trepassey Harbour, N. F.		30·11	55	53	o p q	—
228	Halifax, N.S.		30·15	63	—	c d	—
231	Gibraltar		30·09	73	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	79	—	b c	—
233	Cape Coast Castle, W. C. Africa		29·96	75	—	b c m	*See* 244, 253, 254, 257, & 262.
234	32 33	66 50	29·78	82	—	c q p	Heavy.
238	49 59	5 28	29·95	64	—	b c p	—
240	Port of Spain, Trinidad		30·04	80	—	b c	—
242	Gibraltar		30·10	74	—	b c	—
243	17 37	77 59	29·98	83	84	b c	—
244	Cape Coast Castle, W. C. Africa		30·05	79	—	c	—
245	Omoa, Honduras		30·00	86	—	b c	—
247	Gibraltar		30·09	80	—	b c	—
250	Port Royal, Jamaica		30·00	80	—	b c	—
253	Cape Coast Castle, W. C. Africa		—	—	—	c	—
254	Dix Cove, W. C. Africa		30·10	81	—	b c	—
255	50 0	3 45	29·98	67	62	b c	—
257	Elmina, W. C. Africa		30·03	75	—	b c	—
259	Gibraltar		30·11	75	—	b c	—
260	1 54	8 55	30·18	74	73	b c	—
261	Holy Island, N. E. Coast Eng.		29·72	63	—	o r	—
262	Dix Cove, W. C. Africa		30·05	77	71	o	—
263	0 41	2 39	30·09	81	—	b c	—
266	36 30	67 34	30·12	79	80	b c	—
267	32 26	66 42	29·74	80	80	c q m p	—
268	St. John's, N. F.		30·16	60	—	f d	—
269	Gibraltar		29·98	74	—	b c	—
271	4 33	28 19	—	—	—	fine and dry	—
272	2 59	28 17	—	—	—	c	—
274	46 5	14 34	—	—	—	p	—
276	40 14	71 17	—	—	—	fine	—
277	51 5	29 30	—	—	—	p	—
278	61 45	51 55	29·47	49	46	c b	Short S. and N.W.
279	Nassau, New Providence		30·08	83	84	c b	Slight swell on bar.
280	Marseille		—	—	—	fine	—
281	44 40	40 0	—	—	—	c	High Wly. swell.
282	19 42	65 56	30·07	83	81	b c	—
285	24 25	51 10	30·12	81	81	b	—
286	10 45	78 20	29·89	84	83	b c	—
287	25 30	53 40	30·22	81	82	b	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
288	18 25 N.	76 45 W.	—	84	86	b e r t	—
290	8 0	18 48	—	82	—	—	—
292	Goree, W. C. Africa		—	84	—	—	—
293	Gaboon River, W. C. Africa		29·99	82	—	—	—
						Wind. Dir°. Force.	
11 A.M. / 2 P.M.	St. Louis, Senegal		29·90 / 29·89	78	—	N.W. 1 / S.W. 3	—

AUGUST 23, 1873.

3	43 9 N.	23 41 W.	30·13	66	—	fine and clear	—
4	52 15	38 8	30·27	—	—	clear	—
5	49 26	45 26	30·07	57	55	m	—
6	53 29	30 25	—	—	—	o g	High N.Wly.
9	54 45	22 11	29·95	—	—	fine and pleasant	—
10	42 39	61 55	—	—	—	—	—
22	47 25	39 52	—	—	—	q r	Very heavy.
23	24 20	82 40	—	—	—	clear	—
31	45 50	62 22	—	—	—	c	—
32	51 8	15 24	29·50	57	57	clear	High Wly.
34	50 35	26 41	30·12	57	57	o	N.Wly.
35	46 2	42 40	29·79	66	67	c	—
37	42 38	62 17	30·05	65	68	d	—
39	47 27	70 10	—	—	—	c	—
40	49 24	48 2	—	—	—	r	—
45	23 48	17 8	30·01	72	—	c m	—
46	37 16	36 30	30·23	77	—	c	Heavy W.S.Wly. swell.
47	43 22	26 0	—	68	—	fine	Heavy N.N.E. swell.
50	37 27	23 45	30·25	—	—	b c	—
51	Southampton		—	—	—	b c	—
53	16 4	77 49	29·97	—	—	b c	—
54	18 30	66 9	—	—	—	fine	—
57	42 39	53 16	30·00	72	75	fine	S.S.W. swell.
59	49 43	27 35	30·15	52	57	c	Wly.
65	43 35	49 3	29·95	68	74	c	—
66	41 6	58 7	30·04	76	80	r	—
67	51 10	13 5	29·54	60	60	clear	—
68	55 26	8 55	29·78	—	60	clear	—
69	46 49	71 14	30·11	—	—	c	—
70	56 27	13 12	? 29·74	58	57	fine and clear	—
71	56 14	17 34	29·81	60	56	c	—
74	55 54	28 50	? 30·13	58	57	fine	—
76	47 54	33 28	—	—	—	fine	—
77	28 27	79 15	? 30·06	85	—	fine	—
78	41 58	50 55	29·97	77	—	c	—
82	8 52	46 33	30·08	84	—	q r	—
84	44 53	38 38	—	71	—	c	Heavy.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	°	Ins.	°	°		
86	37 50 N.	49 25 W.	—	—	—	—	Heavy swell.
87	26 7	43 7	—	—	—	fine and clear	—
88	27 20	79 30	—	—	—	sultry	—
93	49 14	24 47	29·96	55	58	q	Heavy N.Wly.
94	50 58	14 56	29·48	58	57	c	—
97	41 11	64 22	30·04	70	70	clear	—
98	42 0	66 5	30·06	66	65	c	—
99	48 45	34 20	30·23	60	62	clear	Heavy N.N.Ely. swell.
101	40 52	65 19	? 30·14	78	76	fine	—
103	47 13	51 8	—	—	—	clear	—
105	Cow Bay, N. S.		—	—	—	p	—
109	45 9	40 53	—	—	—	—	Heavy..
110	31 14	42 29	—	82	—	c	—
113	Lagos, W. C. Africa		—	—	—	c p	Heavy. *See* 153.
121	32 20	64 40	—	—	—	—	—
123	33 5	69 30	? 29·13	—	—	—	—
126	33 45	67 20	? 29·70	—	—	o	Heavy cross.
127	34 40	67 0	—	—	—	—	—
128	37 30	69 40	? 29·80	—	—	—	—
129	38 5	61 20	? 30·10	—	—	—	Sly.
130	33 0	71 30	? 29·70	—	—	—	—
132	22 30	18 35	—	—	—	m	—
133	18 41	23 31	—	—	—	fine	—
135	36 34	13 9	—	—	—	clear	—
139	6 38	25 2	—	—	—	q	—
144	46 15	59 15	—	—	—	fine	—
146	49 7	67 40	—	—	—	clear	—
148	47 5	33 15	—	—	—	fine	—
149	46 27	59 17	—	—	—	clear	—
150	5 38	29 56	—	—	—	c	—
151	27 48	16 36	—	—	—	clear	Moderating.
152	Old Calabar, W. C. Africa		—	—	—	c p	—
153	Lagos, W. C. Africa		—	—	—	fine	Rough.
155	31 0	16 52	—	—	—	fine	—
156	4 20	7 56	—	—	—	c	—
157	41 26	12 30	—	—	—	r	—
159	45 30	51 0	? 29·88 at 3 P.M.	54	56	clear	—
162	19 35	74 50	30·04 at 5 P.M.	—	—	fine	—
163	47 10	58 15	—	—	—	c	—
164	Sydney, Cape Breton		—	—	—	g	—
166	36 4	35 47	—	—	—	c	—
168	48 20	49 32	—	—	—	f	—
171	36 12	61 29	—	—	—	—	—
172	48 7	48 38	29·77	57	55	clear	—
178	Newcastle, Eng.		29·89	67	59	b c	—
179	39 57	35 44	30·22	75	77	b c	Smooth.
181	45 24	39 40	29·73	72	—	c	Heavy cross.
182	47 30	30 10	29·83	58	56	o f r	Moderate.
183	24 25	80 50	30·12	87	84	b c	—
185	40 0	34 28	30·27	79	73	c b	Smooth.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
187	38 46 N.	73 43 W.	30·03	77	76	b c	Fearful heavy swell.
189	25 26	64 47	30·18	80	80	c b	N.W. swell.
190	40 32	68 58	30·10	75	71	c b	Rough.
192	51 36	56 15	29·94	39	53	c g m	Smooth.
194	Ivigtut, Greenland		29·77	44	—	f r	—
197	35 29	15 2	30·20	71	72	b c	Smooth.
200	41 28	66 25	30·06	70	70	c p q	Long Sly.
206	35 9	18 35 E.	30·01	80	81	b	Smooth.
208	47 54	9 25 W.	29·73	64	63	o r	Very wild.
210	53 50	56 50	29·82	52	—	—	—
216	2 26	19 52	30·06	79	77	b c	Smooth.
224	28 13	38 33	30·33	76	76	b c	—
225	20 1	22 36	29·97	82	—	b c	—
227	46 45	52 51	29·96	56	56	b c	—
228	Halifax, N.S.		29·97	63	—	o m	—
231	Gibraltar		—	—	—	b c	*See* 242, 247, 259, & 269.
232	Malaga, S. Spain		—	87	—	b c m	—
233	3 47	0 12 E.	30·06	75	—	b c	—
234	33 35	66 0 W.	29·98	82	—	c q	*See* 267.
238	Plymouth Sound		29·81	65	—	c	*See* 258 and 265.
240	Port of Spain, Trinidad		30·02	81	—	b c	—
242	Gibraltar		30·07	73	—	b c	—
243	18 35	79 46	30·06	82	82	b c	—
244	Cape Coast Castle, W. C. Africa		30·06	78	—	b c	—
245	Port Cortez, Honduras		30·02	81	—	b c	—
247	Gibraltar		30·14	73	—	b c	—
248	St. John's, New Brunswick		29·97	60	—	o f	—
250	Port Royal, Jamaica		30·00	80	—	b c	—
254	4 57	2 37	30·07	81	—	b c	—
255	48 15	5 42	29·80	67	64	b c q	—
256	50 10	3 35	29·80	65	—	b c	—
258	Plymouth Sound		29·85	65	—	b c	—
259	Gibraltar		30·07	77	—	b c	—
260	2 30	7 34	30·17	74	75	b c	—
261	Holy Island, N. E. Coast Eng.		29·76	65	—	b c	—
263	0 33	5 0	30·16	79	—	b c	—
265	Plymouth Sound		29·76	65	—	b c	—
266	34 50	68 30	29·60	77	79	o n q r	Very heavy S.Ely.
267	33 19	66 4	29·96	82	80	c q p	—
268	St. John's, N.F.		—	64	—	b c	—
269	Gibraltar		30·02	75	—	b c	—
271	6 32	27 9	—	—	—	fine and dry	—
272	5 5	28 24	—	—	—	clear	—
273	1 49	22 5	—	—	—	clear	—
274	47 22	11 44	—	—	—	q	—
275	Near mouth of Potomac, U.S.		—	—	—	fine	—
276	40 35	69 40	—	—	—	fine	—
277	50 0	32 0	—	—	—	fine	—
278	62 25	53 40	29·76	46	45	g	W.N.W.
279	Nassau, New Providence		30·09	83	84	c b	Heavy swell on the bar.
280	41 25	8 40 E.	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
281	45 0 N.	44 15 W.	—	—	—	q r	Heavy.
282	22 2	65 31	30·11	83	80	b c	—
285	27 0	48 30	30·23	82	81	b	—
286	13 45	76 30	30·00	84	82	b	—
287	23 5	57 25	30·16	81	81	b	—
289	0 35	9 6 E.	29·96	75	—	—	—
290	10 12	19 0 W.	—	79	—	—	—
292	Goree, W. C. Africa		—	82	—	—	—
293	Gaboon River, W. C. Africa		29·98	82	—	—	—
						Wind. Dir^n Force.	
	11 A.M. } St. Louis, Senegal { 2 P.M. }		29·90	81	—	N.W. 2	—
			29·87	84	—	N.W. 2	—

AUGUST 24, 1873.

3	42 13 N.	26 1 W.	30·19	68	—	fine and clear	—
4	53 48	31 13	30·18	—	—	clear	—
5	47 14	51 33	29·96	57	58	c	—
6	54 41	24 17	—	—	—	fine and clear	Long N.Ely.
9	53 56	29 0	29·85	—	—	c	—
10	44 29	57 14	? 29·82	—	—	c	—
22	48 5	37 12	—	—	—	—	Heavy.
23	26 54	79 36	—	—	—	—	—
31	Pictou Harbour, N.S.		—	—	—	r	—
32	50 7	24 14	30·06	62	59	fine	—
34	51 2	18 37	29·85	60	60	fine and clear	—
35	45 5	48 29	29·94	57	58	fine and clear	—
36	40 22	70 32	29·94	59	66	—	Heavy cross.
37	40 42	68 35	29·72	60	64	c	Short Sly. swell.
39	49 12	65 5	—	—	—	q r m	Very high.
40	48 1	49 40	—	—	—	c	—
45	20 19	17 54	29·92	80	—	c m	—
46	39 11	33 42	30·13	77	—	fine	—
47	44 39	22 54	—	65	—	o	Heavy N.N.E. swell.
50	34 20	28 24	30·23	—	—	b c	—
54	17 58	65 55	—	—	—	fine	—
55	40 14	70 23	29·90	62	62	fine	—
57	42 33	59 15	29·60	72	69	r	Smooth.
59	48 35	35 4	29·95	61	61	f	—
65	42 33	56 7	29·70	74	75	q	—
66	42 12	51 24	29·95	74	75	sultry	—
67	50 13	20 23	29·88	62	61	c,	Heavy N.N.Wly.
68	53 40	17 1	30·11	59	57	o	—
69	49 23	66 9	30·07	48	—	d	—
70	56 33	22 38	? 30·14	56	55	clear	Smooth.
71	55 33	8 55	29·95	61	58	m	—
74	55 57	22 7	? 30·12	62	64	c	Heavy N.Ely. swell
76	48 54	28 42	—	—	—	clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
77	32 35 N.	77 43 W.	? 30·03	86	—	fine	—
78	42 45	46 38	29·99	78	—	fine	—
80	48 57	68 16	—	—	—	o p	—
82	10 22	47 24	30·08	85	—	m	—
84	44 34	42 5	—	70	—	c	Heavy cross.
87	26 46	43 35	—	—	—	b	Smooth.
88	28 56	79 50	—	—	—	fine	—
89	41 50	52 20	—	—	—	clear	—
93	47 57	32 0	30·08	64	62	c	—
94	49 54	23 33	30·01	60	59	fine	—
97	40 38	71 28	29·90	60	62	clear	—
98	41 36	65 15	29·64	66	70	c	—
99	49 58	27 35	30·10	54	58	c	E.N.Ely. swell.
100	40 15	70 55	29·95	59	50	clear	High.
101	41 22	59 13	? 29·62	76	72	o	—
103	45 39	32 38	—	—	—	clear	—
105	Cow Bay, N.S.		—	—	—	r	Increasing.
109	45 41	38 57	—	—	—	c	—
110	31 41	41 28	30·26	82	—	clear	—
113	Lagos, W. C. Africa		—	—	—	c	Heavy.
127	35 10	66 10	—	—	—	—	—
129	38 0	60 10	? 29·10	—	—	—	—
132	24 45	18 4	—	—	—	c	—
133	21 15	21 47	—	—	—	fine	Strong N.N.Ely.
134	0 58	29 53	—	—	—	clear	—
135	40 5	11 14	—	—	—	—	Heavy N.W. swell.
139	5 36	23 4	—	—	—	clear	—
144	46 30	54 10	—	—	—	g m	—
146	47 55	69 35	—	—	—	clear	—
148	47 55	29 30	—	—	—	fine	Strong Nly.
149	46 36	62 15	—	—	—	u	—
150	8 0	30 0	—	—	—	u q r	—
151	29 5	16 10	—	—	—	clear	—
153	5 55	1 5 E.	—	—	—	fine	—
155	32 38	16 55 W.	—	—	—	—	—
156	4 37	3 50	—	—	—	fine	—
157	37 54	15 1	—	—	—	fine	—
159	44 6	56 5	? 29·67 at 3.45 P.M.	68	66	m r	—
62	20 30	73 40	30·02 at 4.56 P.M.	89	—	c	—
162	46 26	57 32	—	—	—	c	—
166	37 3	34 40	—	—	—	fine	—
168	46 38	51 43	—	—	—	clear	—
171	37 56	58 7	—	—	—	c	Tremendous.
172	46 30	53 30	—	—	—	clear	Smooth.
178	Off Hasboro' Light 52 49	1 32 E.	29·95	63	62	o f	—
179	41 24	32 31 W.	30·15	74	74	b c	High W.S.Wly. swell.
181	45 38	38 27	29·86	69	65	c q p d	Heavy confused.
182	49 0	45 42	29·38	56	54	o m	Heavy cross.
183	26 17	80 3	30·13	85	83	b c	Smooth.
185	41 3	32 8	30·16	77	74	b c	W.S.W. & N.N.W. cross.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
187	39 12 N.	74 6 W.	30·10	62	69	b m	Fearful swell.
189	29 12	64 45	30·16	79	79	b	Turbulent.
192	48 53	62 26	29·73	58	59	o g r	Slight E.
194	Ivigtut, Greenland		29·92	45	—	c	—
197	33 13	16 16	30·14	74	73	b	Smooth.
200	40 19	71 27	30·03	62	64	b	Moderate N.N.Wly.
206	34 48	20 48 E.	30·02	79	80	b	Smooth.
208	48 14	9 32 W.	29·60	63	62	b c	Heavy confused.
210	53 50	36 50	30·22	47	—	c	—
216	2 14	22 13	30·04	78	79	c b	Smooth.
224	39 17	37 49	30·22	77	77	b c	—
225	21 59	21 4	30·01	80	—	c m	—
227	St. John's, N.F.		29·87	59	56	b c	*See* 268.
228	Halifax, N. S.		29·47	60	—	c p	—
231	Gibraltar		30·03	72	—	b c	*See* 242, 247, 259, & 269.
232	36 17	5 2	—	73	—	b	—
233	2 2	2 34 E.	30·05	76	—	h c	—
234	34 0	64 15 W.	29·83	79	—	c q p	Heavy.
236	Bantry Bay		29·70	65	—	o p m	*See* 237.
237	Bantry Bay		29·61	64	—	b c	—
240	11 35	61 30	30·04	83	—	b c	—
242	Gibraltar		30·00	74	—	b c	—
243	19 38	81 38	30·03	83	84	b c p	—
244	Cape Coast Castle, W. C. Africa		30·09	83	—	b c	—
245	Port Cortez, Honduras		30·02	80	—	b c	—
247	Gibraltar		30·06	76	—	b c	—
248	St. John's, New Brunswick		29·82	56	—	o c p q	—
250	Port Royal, Jamaica		29·99	80	—	b c	—
255	46 51	7 33	29·75	63	64	c q p	—
256	Spithead		29·83	72	—	c	—
259	Gibraltar		30·03	73	—	b c	—
260	3 41	5 21	30·17	76	77	b c	—
261	Holy Island, N.E. Coast Eng.		30·04	58	—	c f	—
263	0 4	6 28	30·13	77	—	b c	—
266	34 30	69 50	29·97	80	77	b c	—
267	33 37	64 22	29·91	80	82	b c	—
268	St. John's, N.F.		29·92	60	—	b c	—
269	Gibraltar		29·96	72	—	b c	—
271	9 31	26 49	—	—	—	fine and clear	—
272	7 11	28 6	—	—	—	c	—
273	4 9	23 5	—	—	—	clear	—
274	48 47	8 3	—	—	—	clear	—
275	37 33	74 45	—	—	—	c	Heavy.
276	39 35	67 40	29·85	—	—	—	Very cross.
277	49 25	33 30	—	—	—	clear	—
278	62 40	55 35	30·19	43	44	b	Smooth.
279	Nassau, New Providence		30·12	84	85	b c	Swell on the bar.
280	40 9	12 30 E.	—	—	—	fine	—
281	44 20	43 55 W.	—	—	—	c	Heavy cross.
282	24 55	65 13	30·13	82	79	c b	—
284	29 45	45 45	? 30·07	82	80	b c	—
286	15 20	73 20	30·00	84	83	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
287	20 20 N.	61 20 W.	30·03	79	80	o r	—
289	0 37	7 36 E.	29·96	76	—	—	—
290	12 20	18 40 W.	—	82	—	—	—
292	Goree, W. C. Africa		—	82	—	—	—
						Wind. Dir. Force.	
11 A.M. }	St. Louis, Senegal		29·90	86	—	N.W. 1	—
2 P.M. }			29·87	84	—	W. 2	—

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3	42 38 N.	27 8 W.	29·96	79	—	fine and clear	—
4	54 47	23 32	30·07	—	—	o	Long Ely.
5	44 45	57 26	28·93	60	59	c r	High cross.
6	55 13	18 49	—	—	—	g	Heavy N.Ely.
9	52 32	36 0	29·74	—	—	m r	—
10	46 6	54 3	—	—	—	m	High.
22	48 41	32 37	—	—	—	c	—
23	30 2	77 4	—	—	—	—	—
28	2 55	36 36	—	—	—	fine and clear	—
31	Picton Harbour, N.S.		—	—	—	p	—
32	49 26	32 21	29·80	64	58	c	W.S.Wly.
34	51 26	10 58	29·74	61	60	m	—
35	43 54	54 30	29·33	58	59	r	Heavy cross.
36	41 9	65 4	29·59	7	68	q	N.N.Wly.
39	48 47	61 49	—	—	—	q	Tremendous Ely.
40	46 38	51 53	—	—	—	—	—
45	16 58	17 43	29·95	84	—	fine	—
46	40 47	30 36	30·05	75	—	c	—
47	45 35	20 37	—	63	—	c	Very heavy N.N.Ely.
50	31 9	52 53	30·23	—	—	b c	—
54	18 10	65 9	—	—	—	fine	—
55	40 21	63 2	29·66	62	74	c	High confused.
57	42 32	62 10	29·09	57	55	—	High W.N.Wly.
59	46 45	40 45	29·83	61	65	c	W. by S.
65	41 53	59 21	29·08	63	63	clear	High W.S.Wly.
66	44 18	44 31	29·91	76	76	c	—
67	49 22	27 24	29·91	63	60	c	—
68	55 40	25 25	30·09	58	56	o	—
69	48 50	61 47	29·95	48	—	p	Increasing heavy.
70	56 25	31 27	? 29·85	54	52	o	—
74	55 48	16 3	? 29·97	59	58	o	—
76	49 27	23 48	—	—	—	g c	—
77	36 5	75 35	? 30·06	76	—	fine	—
78	43 38	42 20	30·00	76	—	c	—
80	49 0	68 0	—	—	—	clear	—
82	12 23	48 51	30·08	82	—	c	—
84	45 52	46 34	—	73	—	g	—
87	27 48	43 54	—	—	—	clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
88	30 0 N.	79 45 W.	—	—	—	e	—
89	44 7	48 12	—	—	—	r	—
93	46 30	37 25	29·93	63	61	c	High swell.
94	48 39	32 1	29·85	60	60	o	—
98	40 53	69 11	29·89	59	60	clear	Smooth.
99	50 41	20 50	29·91	60	57	c	—
100	40 30	65 34	29·68	60	71	q	High.
101	42 10	55 35	? 29·37	70	70	q	High S.Wly.
103	46 3	56 3	? 29·06	—	—	m r q	High.
105	Cow Bay, N.S.		—	—	—	r	—
109	45 41	35 45	—	—	—	fine	—
110	32 35	40 6	30·31	80	—	e q	—
113	Lagos, W.C. Africa		—	—	—	e	Heavy.
129	37 40	59 30	—	—	—	—	—
132	27 26	17 39	—	—	—	fine	—
133	23 24	20 36	—	—	—	fine	Heavy N.N.E.
134	5 43	28 48	—	—	—	clear	—
135	43 39	9 4	—	—	—	clear	Very High W.N.Wly.
139	5 56	20 56	—	—	—	fine	—
142	30 20	65 25	—	—	—	—	—
144	46 50	50 45	—	—	—	g r	Very High.
148	48 20	35 20	—	—	—	fine	—
149	47 10	63 55	—	—	—	—	Heavy.
150	10 4	29 50	—	—	—	p	—
152	4 22	7 40 E.	—	—	—	—	—
155	34 36	15 22 W.	—	—	—	fine	Smooth.
156	5 5	1 15	—	—	—	m	Heavy Sly. swell.
157	33 52	16 16	—	—	—	very fine	Smooth.
159	43 8	57 58	? 28·54	63	67	o	Like mountains.
162	22 50	74 35	—	—	—	fine	—
164	Sydney, Cape Breton		29·12	—	—	q	—
166	38 9	32 49	—	—	—	fine	—
168	45 42	54 18	—	—	—	fine and clear	Heavy Sly.
171	38 14	57 18	—	—	—	—	Heavy.
172	47 37	59 24	29·48	—	—	m r	Very heavy.
179	42 21	30 44	30·03	73	73	b c	High W.S.Wly.
181	45 58	35 39	29·90	68	65	e	High W.S.Wly. swell.
182	50 13	40 11	29·68	61	62	o m q	—
183	28 10	79 30	30·11	87	84	b c	Smooth.
185	41 52	39 25	30·05	74	72	c b	W. swell.
188	18 30	74 30	29·99	85	85	c b m	—
192	48 5	69 30	30·02	46	47	b e r	Smooth.
194	Ivigtut, Greenland		29·95	53	—	b	—
195	51 14	15 19	29·78	62	61	b e	Moderate Nly.
197	31 36	17 26	30·17	76	73	e	Slight N.N.E. swell.
206	34 24	25 32 E.	29·93	78	77	b	Slight.
208	47 34	10 42 W.	29·60	65	64	b e	Slight W.S.Wly. swell.
210	53 50	56 50	30·24	51	48	e	—
215	49 58	7 22	29·68	62	62	o p	Slight S.Wly.
216	2 0	24 16	30·04	78	79	e	Smooth.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
224	30 28 N.	36 37 W.	30·27	77	77	b c	—
225	23 48	20 30	30·06	79	—	b c	—
227	St. John's, Newfoundland		29·64	54	53	o q r	*See* 268.
228	Halifax.		29·37	57	—	b c q	—
231	Gibraltar		29·98	71	—	b c	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	73	—	b c	—
233	0 28	4 45 E.	30·04	75	—	b c	—
234	32 59	64 30 W.	30·01	78	—	b c	—
236	Bantry Bay		29·64	62	—	b c p	*See* 237 and 270.
237	Bantry Bay		29·56	67	—	b c p	—
240	St. George's, Grenada		30·01	82	—	b c	—
242	Gibraltar		29·97	74	—	b c	—
243	20 59	83 30	29·97	84	83	b c	—
244	Cape Coast Castle, W. C. Africa		30·09	83	—	b c	*See* 253, 254, 257, & 261.
245	Port Cortez, Honduras		29·99	81	—	b c	—
247	Gibraltar		30·02	73	—	b c	—
250	Port Royal, Jamaica		29·88	79	—	b c	—
253	Dix Cove, W.C. Africa		—	—	—	e m	—
254	Dix Cove, W.C. Africa		30·11	81	—	b c	—
255	45 24	8 44	29·76	61	66	b c q p	—
256	50 3	2 37	29·79	65	—	b c	—
257	Elmina, W.C. Africa		30·04	74	—	c	—
259	Gibraltar		—	—	—	b c	—
260	3 55	4 2	30·12	77	77	b c	—
261	Holy Island, N.E. Coast Eng.		30·04	58	—	q d	—
262	Cape Coast Castle		30·04	76	71	c d	—
266	33 0	70 41	30·08	71	75	b c	—
267	33 6	64 4	29·97	75	76	b c	—
268	St. John's, Newfoundland		29·68	58	—	r q f	—
269	Gibraltar		29·93	71	—	b c	—
270	Bantry Bay		29·67	69	—	b c m p	—
271	11 47	26 56	—	—	—	fine	—
272	9 37	27 33	—	—	—	e	—
273	6 58	23 34	—	—	—	clear	—
274	49 22	7 0	—	—	—	r	—
275	39 3	72 36	29·67	—	—	fine	—
276	39 5	63 45	—	—	—	—	Very heavy cross.
278	62 25	57 30	30·24	46	45	b c m	Smooth.
279	Nassau, New Providence		30·07	83	84	c b	Heavy swell on bar.
280	38 0	15 30 E.	—	—	—	fine	—
281	44 0	44 25 W.	—	—	—	e	Heavy Wly.
282	26 49	65 1	30·07	81	80	b c	—
286	16 35	69 50	29·99	83	83	c b r	—
287	18 20	64 45	30·06	82	81	o r	—
289	8 34	6 0 E.	30·00	77	—	—	—
290	Goree, W. C. Africa		—	79	—	—	*See* 292.
292	Goree, W. C. Africa		—	80	—	—	—
11 A.M. / 2 P.M.	St. Louis, Senegal		29·89 / 29·87	82 / 85	—	Wind. Dir^n. Force. S. 2 / S. 2	—

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No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
3	42 28 N.	27 3 W.	30·08	73	—	fine and clear	—
4	55 5	16 30	29·77	—	—	m	—
5	43 7	59 42	29·83	55	57	c	Heavy S.Wly.
6	55 18	12 56	—	—	—	c r m'	E.N.Ely. swell.
9	50 50	41 49	29·88	—	—	c	—
10	47 50	50 13	? 29·65	—	—	f	—
22	49 6	27 37	—	—	—	c p	—
23	52 10	74 9	—	—	—	clear	—
28	6 20	34 57	—	—	—	—	—
31	Pictou Harbour, N.S.		—	—	—	p	—
32	48 8	39 40	—	66	64	f	W.S.Wly.
35	43 20	57 23	29·59	53	54	c	Heavy cross.
36	42 39	59 1	29·66	56	56	c	Occasional N.N.Wly.
39	48 42	60 52	—	—	—	m q	Tremendous N.N.Ely.
40	46 4	51 49	? 29·55	—	—	—	Heavy.
41	48 54	5 7	29·90	—	—	b c q	Heavy S.Wly.
45	14 10	17 33	30·10	85	—	b c	Sly.
46	42 35	28 14	30·06	73	—	fine	—
47	46 15	18 17	—	66	—	c	—
50	28 8	37 8	30·26	—	—	b c	—
51	48 16	5 25	29·89	—	—	b c	S.S.Wly.
53	18 7	72 35	—	—	—	b c	—
54	San Juan		—	—	—	fine	—
	18 28	66 5					
55	41 16	56 1	29·80	63	69	o p'	Wly.
57	42 38	66 53	29·81	54	51	c	Smooth.
59	44 46	46 24	29·83	73	71	fine	—
65	40 57	64 1	29·81	62	70	clear	—
66	46 47	37 35	30·00	72	70	m	—
67	48 2	32 53	29·96	62	62	m	—
68	55 30	33 10	29·68	52	54	—	High cross.
69	48 35	61 11	29·97	48	—	q r u g	High dangerous.
70	55 24	39 39	? 30·06	53	50	fine and clear	Heavy.
74	55 26	9 47	? 29·62	66	60	fine	—
76	50 3	19 1	—	—	—	fine	—
78	44 41	38 14	30·05	75	—	fine	—
82	49 6	68 0	—	—	—	c	—
83	14 19	51 6	30·08	82	—	q p	—
84	43 10	50 58	—	70	—	q	—
87	29 13	43 50	—	—	—	q c	—
88	31 0	79 30	—	—	—	clear	—
89	45 11	43 14	—	—	—	m	Heavy.
93	44 38	45 2	29·97	76	74	o	Heavy Wly. swell.
94	46 56	39 6	29·97	64	62	m	—
99	51 10	13 44	29·68	58	60	clear	—
100	40 49	59 49	29·79	65	66	p	—
101	43 25	49 30	—	62	58	clear	—
103	46 59	57 50	? 29·25	—	—	q	Going down.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
105	Cow Bay, N.S.		—	—	—	d	—
109	46 4 N.	56 W.	—	—	—	c	—
110	33 55	38 7	30·41	81	—	clear	—
113	6 5	1 20 E.	—	—	—	c	—
132	30 15	16 43 W.	—	—	—	fine	—
133	25 28	18 50	—	—	—	fine	—
134	10 0	27 15	—	—	—	c	—
135	47 24	6 28	—	—	—	clear	—
139	5 31	20 42	—	—	—	fine	—
142	30 30	65 33	—	—	—	—	—
144	47 25	47 30	—	—	—	g	Heavy.
148	48 30	21 10	—	—	—	r m	—
149	46 55	63 5	—	—	—	—	Heavy.
150	11 7	29 8	—	—	—	sultry	—
151	34 45	15 55	—	—	—	clear	—
152	4 27	7 21 E.	—	—	—	r	—
153	5 0	1 12 W.	—	—	—	fine	—
155	37 16	13 58	—	—	—	fine	—
156	5 31	0 11	—	—	—	fine	Heavy swell.
157	Funchal Roads, Madeira		—	—	—	fine	—
159	42 6	59 45	? 29·21	55	60	clear	Heavy.
162	24 36	74 47	—	—	—	fine	—
164	Sydney, Cape Breton		—	—	—	g	—
166	39 8	31 19	—	—	—	fine	—
168	46 6	56 20	—	—	—	m	Fearfully heavy W.S.Wly.
171	39 27	53 32	—	—	—	—	Heavy.
172	48 25	60 35	29·42	—	—	r	Very heavy.
179	43 5	28 58	30·06	72	72	c b r	W.N.Wly. and N.N.Ely.
181	46 39	31 56	29·99	67	65	c	Moderate.
182	51 17	35 22	29·90	55	55	m q	Moderate N.W.
183	28 58	79 12	30·07	84	84	b c	—
185	42 45	28 30	30·08	73	72	b c	W. swell, cross E.N.Ely. sea.
186	0 5	19 35	30·10	76	75	b c	Smooth.
188	18 50	74 30	30·00	86	80	b	—
189	34 22	64 11	30·02	76	77	b	Heavy Nly. swell.
194	Ivigtut, Greenland		30·12	48	—	b	—
195	50 26	23 44	29·69	64	60	c	Slight confused.
197	30 20	18 8	30·21	78	74	b c	Slight N.N.E. swell.
206	33 52	25 52 E.	29·86	80	80	b	Smooth.
208	46 0	11 28 W.	29·95	68	65	c	—
210	53 45	56 30	30·10	48	—	o	—
215	48 10	8 20	29·81	61	61	b e	—
216	1 24	26 25	30·07	79	79	c b	Smooth.
224	31 49	35 26	30·23	77	77	b e	—
225	25 44	18 48	30·17	80	—	b c	—
227	St. John's, N.F.		29·47	60	57	b e	*See* 268.
228	Halifax		29·70	50	—	o q	—
231	Gibraltar		30·00	70	—	b e	*See* 232, 242, 247, 259, and 269.
232	Gibraltar		—	76	—	b e	—
236	Bantry Bay		—	66	—	b e	*See* 237 and 270.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
237	Bantry Bay		29·48	63	—	b c	—
238	Plymouth Sound		29·66	61	—	b e p q	*See* 256, 258, and 265.
240	St. George's, Grenada		29·99	80	—	b e p	—
242	Gibraltar		29·99	72	—	b e	—
243	22 16 N.	85 4 W.	29·99	80	85	b e	—
244	Elmina, W. C. Africa		30·09	77	—	o	*See* 254, 257, and 262.
245	Port Cortez, Honduras		30·02	81	—	b e	—
247	Gibraltar		29·94	70	—	b c	—
250	Port Royal, Jamaica		29·93	80	—	b e	—
253	4 45	2 0	29·95	—	—	o p m	*See* 260.
254	Dix Cove, W. C. Africa		30·07	80	—	o	—
255	43 28	8 52	30·11	68	63	b c	—
256	Plymouth Sound		29·74	68	—	e p q	—
257	Dix Cove, W. C. Africa		30·03	73	—	e p	—
258	Plymouth Sound		29·69	61	—	e p q	—
259	Gibraltar		30·03	73	—	b e	—
260	4 25	2 11	30·15	78	75	o	—
261	Off Berwick-upon-Tweed		29·96	53	—	f	—
262	Cape Coast Castle, W. C. Africa		30·02	76	72	b c m	—
265	Plymouth Sound		—	—	—	e p q	—
266	32 3	71 12	30·05	75	78	b c	—
268	St. John's, N. F.		29·63	62	—	b c	—
269	Gibraltar		29·93	73	—	b c	—
270	Bantry Bay		29·58	66	—	b e m	—
271	14 9	26 58	—	—	—	e	—
272	12 25	27 1	—	—	—	fine and clear	—
273	9 44	34 36	—	—	—	clear	—
275	40 40	69 55	—	—	—	e	—
276	40 40	58 30	—	—	—	g	Very heavy swell.
277	48 45	39 45	—	—	—	o m	—
278	63 30	59 30	30·13	46	44	b	Smooth.
279	Nassau, New Providence		30·06	83	83	b c	—
280	37 0	19 35 E.	—	—	—	fine	Heavy.
281	44 15	47 35 W.	—	—	—	—	Heavy Wly.
282	27 43	65 21	30·05	79	79	b	—
286	18 0	65 45	29·99	83	83	b	—
289	0 35	4 15 E.	29·99	77	—	—	—
290	Goree, W. C. Africa		—	84	—	—	—
						Wind. Dir. Force.	
11 A.M. } 2 P.M. }	St. Louis, Senegal		29·99	84	—	S.W. 3	—
			29·98	84	—	N.W. 1	—

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3	41 57 N.	28 51 W.	30·31	75	—	o	—
5	41 44	64 27	30·07	57	58	clear and fine	—
8	40 27	72 3	30·08	70	66	clear	—
9	49 18	46 39	29·91	—	—	e	—
10	49 38	45 18	—	—	—	fine and clear	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
22	49 26 N.	21 54 W.	—	—	—	e	—
23	33 49	70 39	—	—	—	e	—
28	9 23	33 0	—	—	—	—	—
31	Picton Harbour, N. S.		—	—	—	—	—
32	46 36	46 11	29·97	58	56	clear	W.S.Wly.
35	42 2	62 16	29·91	57	55	e	Smooth.
36	44 22	51 4	29·92	60	64	e	—
39	50 4	60 25	—	—	—	m	Smooth.
40	45 47	52 13	? 29·65	—	—	—	—
41	46 12	7 35	30·02	—	—	b e q	S.Wly. increasing.
45	10 45	17 7	30·01	84	—	o q	—
46	44 24	24 53	30·13	71	—	g	—
47	47 22	14 8	—	64	—	q	—
50	25 8	41 30	30·30	—	—	b c	—
51	45 32	7 18	30·04	—	—	e m	S.S.Wly.
53	17 41	68 37	30·00	—	—	b c	—
54	St. Thomas, W. I.		—	—	—	fine	—
55	42 29	49 21	30·03	64	64	fine	—
59	43 13	51 35	29·77	69	65	—	High.
61	42 27	66 23	29·77	53	56	fine	—
65	40 33	71 3	29·96	60	60	fine	—
66	48 19	29 45	30·11	68	66	clear	—
67	46 39	38 24	30·03	67	65	m	—
68	54 40	40 13	30·31	48	51	e	—
69	47 49	59 46	? 30·08	50	—	clearing	High.
70	53 30	47 54	? 29·81	56	55	f d	—
76	50 55	13 29	—	—	—	e	—
78	46 0	54 5	30·14	71	—	m	—
80	49 21	66 32	—	—	—	clear	—
82	15 49	53 21	30·10	83	—	fine and clear	—
84	42 52	54 20	—	95	—	e	—
87	50 53	43 29	—	—	—	—	Very short swell. W.N.Wly.
93	43 30	48 10	30·04	69	67	clear	High Wly.
94	44 58	45 36	29·98	71	68	e	High.
99	52 4	6 28	29·64	66	63	e	—
100	41 54	54 22	29·94	68	70	p q	—
101	45 32	43 52	? 30·12	77	74	o	—
103	47 24	59 36	? 29·66	—	—	m r	—
109	46 31	30 17	—	—	—	p	—
110	34 32	37 22	—	83	—	clear	—
113	5 22	0 28	—	—	—	e	Heavy.
132	32 39	14 37	—	—	—	e	—
133	27 48	16 36	—	—	—	e	—
134	14 15	26 26	—	—	—	clear	—
135	50 25	2 35	—	—	—	m	—
139	5 2	19 23	—	—	—	clear	—
142	50 18	65 15	—	—	—	fine	Nly. swell.
148	48 50	16 20	—	—	—	q	High.
149	47 10	61 45	—	—	—	moderating	—
150	12 36	29 8	—	—	—	clear, very hot	—
151	38 4	14 15	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
153	5 9 N.	4 21 W.	—	—	—	c p	—
155	40 24	13 26	—	—	—	fine	—
156	5 55	1 0 E.	—	—	—	fine	—
157	29 12	16 22 W.	—	—	—	b	—
159	41 4	63 46	—	64	62	fine	—
162	25 51	75 5	—	—	—	fine	—
164	Sydney, Cape Breton		—	—	—	g	—
166	39 28	50 3	—	—	—	fine	—
168	45 28	56 35	—	—	—	clear	—
171	39 25	49 18	—	—	—	—	—
172	49 5	63 20	—	—	—	fine	Smooth.
179	44 3	25 9	30·19	68	70	b c	W.N.Wly. and N.N.Ely. cross.
180	60 0	28 30 E.	30·15	63	—	b c	—
181	47 1	29 16 W.	30·09	68	66	o f	Moderate.
182	52 38	30 36	30·09	52	54	c b	Heavy N.N.W.
183	29 22	78 31	30·07	84	83	b c	—
185	43 48	26 18	30·25	73	69	b c	Moderate.
186	1 24	20 19	30·07	79	79	c m	Smooth.
188	19 13	74 27	30·01	87	84	b c	—
189	37 52	64 49	29·82	76	78	r	Turbulent.
194	61 10	48 44	30·11	41	40	b	Smooth.
195	49 15	29 51	30·12	64	62	o	Moderate Nly.
197	28 41	18 35	30·21	75	73	b c	Slight.
206	33 32	27 9 E.	29·88	83	81	b	Slight.
208	45 16	12 3 W.	29·95	69	66	b	Short chopping.
210	53 45	56 30	29·90	47	—	—	—
215	46 39	8 24	29·84	65	65	m r	Heavy W.N.Wly. and S.S.Wly. swells.
216	1 8	28 37	30·04	80	78	b	Smooth.
224	33 8	34 55	30·38	77	77	b c	—
225	27 35	16 51	30·20	77	—	b c	—
227	St. John's, N. F.		29·66	53	53	o q	*See* 268.
228	Halifax, N. S.		29·94	53	—	b c	—
231	Gibraltar		30·05	70	—	b c	*See* 242, 247, 259, & 269.
232	36 40	2 20	—	71	—	b m	—
236	51 33	10 3	29·49	62	—	c	*See* 237 and 270.
237	Entrance to Bantry Bay		29·41	64	—	c p	—
238	Plymouth Sound		29·76	67	—	c q	*See* 256, 258, and 265.
240	St. George's, Grenada		30·02	83	—	b c	—
242	Gibraltar		30·03	72	—	b c	—
243	23 24	82 48	30·03	83	84	b c	—
244	Elmina, W. C. Africa		30·12	81	—	b c	*See* 253, 254, 257, & 263.
245	Port Cortez, Honduras		29·99	80	—	c	—
247	Gibraltar		30·07	72	—	b c	—
250	Port Royal, Jamaica		29·96	78	—	b c	—
253	Axim, W. C. Africa		29·91	75	—	b c	—
254	Secondee, W. C. Africa		30·11	81	—	b c	—
255	41 11	9 46	30·17	70	66	c	—
256	Plymouth Sound		29·79	63	—	c q	—
257	Dix Cove, W. C. Africa		30·07	76	—	b c	—
258	Plymouth Sound		29·87	63	—	c q	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
259	Gibraltar		30·03	72	—	b c	—
260	4 53 N.	1 36 W.	30·16	78	79	b c	—
261	Holy Island, N.E. Coast Eng.		29·62	64	—	b c	—
262	Cape Coast Castle, W. C. Africa		30·04	76	73	b c	—
265	Plymouth Sound		29·70	65	—	c	—
266	30 36	72 15	30·02	79	79	b c	—
268	St. John's, N. F.		29·70	56	—	c q	—
269	Gibraltar		30·03	73	—	b c	—
270	51 33	10 3	29·52	62	—	c d	—
271	15 15	27 9	—	—	—	fine	—
272	12 45	27 20	—	—	—	fine and clear	—
273	11 24	25 3	—	—	—	clear	—
275	42 32	67 30	—	—	—	clear	Smooth.
276	42 0	55 45	—	—	—	fine	Very nasty S.Ely.
277	48 55	40 40	—	—	—	m	Heavy cross.
278	64 0	63 30	29·86	38	33	b c m	Smooth.
279	Nassau, New Providence		30·08	82	84	b c	—
280	36 36	23 3 E.	—	—	—	fine	Heavy.
281	44 35	49 35 W.	—	—	—	clear	Heavy Sly.
282	28 42	65 34	30·04	79	79	c b	—
287	15 55	69 15	30·01	84	84	b c	—
289	0 42	2 43 E.	29·96	77	—	—	—
290	Goree, W. C. Africa		—	77	—	—	—
						Wind. Dir. Force.	
11 A.M.	St. Louis, Senegal		29·93	86	—	N.W. 3	—
2 P.M.			29·91	88	—	N.W. 2	—

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3	41 59 N.	29 37 W.	30·38	78	—	fine	—
5	40 43	70 16	30·33	59	60	clear and fine	Smooth.
8	40 41	68 44	? 30·32	57	58	clear	—
9	47 18	51 16	29·98	—	—	c	—
10	51 25	39 46	? 30·00	—	—	c r	—
22	50 3	16 14	—	—	—	c	Heavy.
23	35 34	67 11	—	—	—	c	—
28	12 24	31 23	—	—	—	fine and clear	—
31	Pictou Harbour, N.S.		—	—	—	fine	—
32	44 41	52 40	29·94	57	60	c	W.S.Wly.
35	40 51	68 32	30·23	58	54	very fine	—
36	45 51	46 12	29·93	59	59	c	Smooth.
39	51 31	56 25	—	—	—	b c	Smooth.
40	45 27	52 56	—	—	—	m	—
41	43 44	9 48	30·28	—	—	b c	—
45	7 29	15 30	30·02	82	—	p q	Heavy S.S.Ely.
46	45 4	23 40	30·25	70	—	m	—
47	48 48	8 42	—	64	—	q	Tremendous.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
50	21 55 N.	45 31 W.	30·26	—	—	b c	—
51	45 22	8 23	30·28	—	—	b c	—
53	18 20	64 56	—	—	—	b c	—
54	17 6	62 39	—	—	—	fine	—
55	44 56	42 47	—	70	70	o p	—
56	40 22	68 15	30·21	62	63	fine	—
59	42 37	58 12	30·11	57	56	fine	—
61	42 14	60 25	30·09	56	59	o	—
66	49 47	21 57	30·23	66	64	fine	Heavy Wly. swell.
67	45 4	43 3	29·87	70	72	c	—
68	53 37	47 34	29·76	53	51	g	—
69	46 34	53 19	29·88	56	—	clear	Smooth.
70	52 28	54 41	? 29·85	52	50	m	—
76	51 49	7 37	—	—	—	c	—
78	47 13	29 48	30·15	74	—	m	—
80	48 46	63 39	—	—	—	clear	—
82	17 29	55 41	30·13	85	—	fine	—
84	41 52	59 33	—	63	—	clear	—
87	52 13	42 56	—	—	—	c	Heavy W.N.Wly. swell.
88	35 29	74 53	—	—	—	c	—
93	42 0	53 31	30·01	66	70	c	Smooth.
94	42 52	51 55	29·96	63	61	c	—
100	42 49	49 5	29·99	65	63	o	—
101	47 43	38 7	? 30·01	70	66	c	—
103	47 36	60 17	—	—	—	clear	—
109	46 50	28 32	—	—	—	c	—
110	35 5	36 46	—	80	—	clear	—
113	5 2	3 0	—	—	—	c	—
132	35 3	12 19	—	—	—	fine	—
133	30 23	14 50	—	—	—	c	—
134	18 7	24 59	—	—	—	c m	—
139	4 22	19 43	—	—	—	clear	—
142	30 35	65 25	—	—	—	p	—
148	49 0	11 0	—	—	—	q	Heavy Wly.
149	47 30	62 30	—	—	—	fine	—
150	13 7	29 11	—	—	—	very hot	—
151	41 33	12 16	—	—	—	clear	—
153	4 22	7 16	—	—	—	fine	—
155	43 25	10 50	—	—	—	c	Heavy W.N.W.
156	6 19	2 5 E.	—	—	—	fine	—
157	26 33	16 39 W.	—	—	—	fine	—
162	26 40	75 35	—	—	—	c	—
164	Sydney, Cape Breton		—	—	—	fine	—
166	39 40	29 36	—	—	—	fine	—
168	45 47	58 54	—	—	—	o	—
171	39 50	45 21	—	—	—	c g	—
172	48 31	68 31	—	—	—	fine	—
178	Off the Dudgeon		29·48	62	60	p c	—
	53 15	0 56 E.					
179	44 34	22 57 W.	30·32	68	68	c d f	High W.N.Wly. swell.
180	39 10	22 15 E.	30·11	65	—	b c	—
181	47 19	27 30 W.	30·20	66	65	o f d	Smooth.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
182	53 36 N.	26 0 W.	30·14	54	54	b c	Rough.
183	30 10	77 44	30·11	84	83	b c	—
185	44 46	24 28	30·32	69	67	o m d	Heavy W. swell.
186	4 38	20 50	30·06	81	81	o	Smooth.
188	20 3	73 56	30·07	89	85	b v	—
189	40 59	63 32	30·21	62	64	c b	Smooth.
194	60 16	50 10	30·01	42	42	b	Smooth.
195	47 43	36 53	30·04	67	64	o m	Moderate Nly.
196	51 21	11 37	29·81	54	59	c	Rough N.W.
197	26 48	19 0	30·19	78	75	c b	Slight.
206	33 11	28 59 E.	29·84	77	78	b	Slight.
208	43 29	13 5 W.	30·26	67	66	b c	Long rolling N.Wly. swell.
210	53 43	56 30	30·02	48	—	b	—
215	45 20	9 25	30·16	65	65	o m	Heavy W.S.Wly. swell.
216	0 55	29 30	30·05	81	77	c b	Smooth.
224	34 4	33 11	30·43	77	76	b c	—
225	28 32	16 28	30·22	78	—	b c	—
227	St. John's, N.F.		29·89	53	54	c	*See* 268.
228	Halifax, N.S.		30·15	54	—	b c	—
231	Gibraltar		30·09	71	—	b c	*See* 242, 247, 259, & 269.
232	37 35	0 56	—	84	—	b c	—
237	Queenstown		29·45	59	—	c p q	—
238	Plymouth Sound		29·51	62	—	c q	*See* 256, 258, and 265.
240	12 40	60 38	30·07	83	82	b c	—
242	Gibraltar		30·07	73	—	b c	—
244	Elmina, W. C. Africa		30·09	81	—	b c	*See* 253, 257, 260, & 262.
245	Port Cortez, Honduras		29·97	80	—	b c	—
247	Gibraltar		30·06	70	—	b c	—
248	43 21	66 28	30·21	53	—	b c	—
250	Port Royal, Jamaica		30·00	79	—	b c	—
253	Secondee		29·95	76	—	b c	—
255	38 22	9 22	30·26	71	65	b c	—
256	Plymouth Sound		29·56	62	—	c p	—
257	Aquidah, W. C. Africa		30·07	75	—	b c	—
258	Plymouth Sound		29·56	63	—	o p q	—
259	Gibraltar		30·07	72	—	b c q	—
260	Cape Coast Castle, W. C. Africa		30·16	78	74	b c	—
261	Holy Island, N. E. Coast Eng.		29·40	64	—	b c q	—
262	Cape Coast Castle, W. C. Africa		30·03	77	73	b c m	—
265	Plymouth Sound		29·56	65	—	c q	—
266	28 52	73 28	30·10	79	81	b c	—
267	33 32	64 25	30·08	79	80	b c	—
268	St. John's, N.F.		29·89	58	—	c	—
269	Gibraltar		30·02	73	—	b c	—
271	16 33	28 23	—	—	—	dry	—
272	13 2	27 30	—	—	—	fine and clear	—
273	12 6	24 30	—	—	—	clear	—
274	Off Folkestone		—	—	—	q r	—
275	43 42	64 13	—	—	—	fine	—
276	41 35	53 35	—	—	—	d	Heavy.
277	30 5	42 35	—	—	—	m	—
278	64 12	64 30	29·86	35	32	o m	—
279	Nassau, New Providence		30·11	82	84	c b	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
280	38 47 N.	25 20 E.	—	—	—	fine	—
281	44 5	51 20 W.	—	—	—	c	Heavy.
282	29 48	64 21	30·17	80	79	c	—
284	20 13	49 33	—	82	81	b	—
286	19 25	62 55	30·08	83	82	b c p	—
287	13 55	73 25	29·94	82	83	b	Calm.
289	1 8	1 57 E.	30·04	77	—	—	—
290	Goree, W. C. Africa		—	82	—	—	—
						Wind. Dir. Force.	—
11 A.M.	St. Louis, Senegal		29·90	86	—	S.E. 1	
2 P.M.			29·92	92	—	S.E. 1	

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3	43 0 N.	32 24 W.	30·09	81	—	clear	Heavy W.N.Wly.
8	41 42	65 24	? 30·41	63	61	clear	—
9	44 57	56 7	30·00	—	—	fine and clear	—
10	52 55	34 16	? 29·75	—	—	clear	—
22	51 2	10 40	—	—	—	c	—
23	37 12	63 46	—	—	—	c	—
28	15 18	30 14	—	—	—	fine and clear	—
31	Pictou Harbour, N.S.		—	—	—	fine	—
32	42 50	59 47	30·25	60	56	fine	Smooth.
33	51 44	8 15	29·80	61	—	clear	Sly. *See* 63 and 102.
35	40 29	73 56	30·39	60	57	fine and clear	—
36	47 27	59 55	29·87	60	65	c	—
39	52 55	51 10	—	—	—	m p	—
40	44 44	53 35	—	—	—	clear	—
41	38 29	11 38	30·28	—	—	b c	Nly.
45	4 46	13 54	30·13	81	—	b m	—
46	46 5	21 5	30·14	70	—	c	Wly. swell.
47	50 0	3 50	—	63	—	q	—
50	19 2	49° 44	30·14	—	—	b c	—
51	Carill Bay		30·29	—	—	b c	—
	42 37	8 46					
53	15 52	62 38	30·10	—	—	b c	—
54	15 6	61 23	—	—	—	fine	—
55	47 9	36 8	29·93	—	65	o	—
56	41 3	62 2	30·27	71	79	fine	—
59	41 21	65 5	30·28	61	64	fine	—
61	41 56	54 22	30·11	61	69	c	—
63	51 52	7 42	—	—	—	fine	—
66	50 44	13 26	30·06	62	63	d	—
67	45 23	48 5	29·96	60	66	c	—
68	52 6	54 26	29·86	53	59	—	—
69	48 34	46 40	29·99	60	55	—	—
70	49 22	60 50	? 29·98	60	56	clear	—
73	49 0	67 12	30·14	76	—	b c	—
78	48 29	25 6	29·90	69	—	m	—

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
80	47 33 N.	60 50 W.	—	—	—	m	—
82	19 35	58 30	30·19	85	—	m	—
84	40 46	64 44	—	70	—	clear	—
87	33 1	42 4	—	—	—	c	—
88	36 33	73 51	—	—	—	g	—
93	41 19	59 57	30·30	64	62	clear	Smooth.
94	42 0	59 14	30·24	63	62	fine	—
95	51 16	14 32	—	—	—	o	Wly.
100	44 24	44 3	29·94	63	58	c	—
101	48 58	31 10	? 29·86	69	62	c	—
102	51 49	8 15	—	—	—	o	High W.S.Wly.
103	48 43	61 23	—	—	—	clear	—
109	47 25	25 1	—	—	—	c	—
110	35 45	34 54	—	69	—	clear	—
113	5 9	3 23	—	—	—	c	—
132	37 26	10 22	—	—	—	clear	—
133	33 1	13 12	—	—	—	fine	High N.N.Ely.
134	21 6	22 42	—	—	—	c	High N.N.Ely.
139	2 53	21 18	—	—	—	clear	—
142	30 37	64 55	—	—	—	fine	—
150	13 44	30 44	—	—	—	c	—
151	44 59	10 24	—	—	—	c	—
152	Bonny, W.C. Africa		—	—	—	c	—
153	4 21	7 44	—	—	—	c	—
155	46 3	9 24	—	—	—	c	—
156	6 26	3 26 E.	—	—	—	fine	Heavy S.S.Wly. swell.
157	22 49	17 41 W.	—	—	—	fine	—
162	28 15	75 8	—	—	—	fine	—
166	40 32	28 14	—	—	—	fine	—
168	46 10	38 15	—	—	—	clear	—
171	40 56	41 9	—	—	—	q	—
178	Newcastle, Eng.		—	61	61	c	*See* 261.
179	43 32	20 54	30·22	68	67	c f	Long N.N.Wly. swell.
180	57 6	18 40 E.	29·75	62	—	c r	—
181	47 16	23 36 W.	30·02	67	63	o	Moderate.
182	54 17	21 18	29·73	53	55	b c	Heavy swell.
183	31 27	77 12	30·25	85	83	b c	—
185	45 41	22 35	30·19	68	66	o m d	W. swell.
186	6 51	21 23	30·07	82	80	c	Smooth.
188	22 25	74 23	30·16	84	84	b c m	—
189	44 33	63 36	30·26	59	60	b	Smooth.
194	58 58	50 54	29·73	46	46	o r	Smooth.
195	45 44	42 41	29·99	59	59	o	Slight confused.
196	50 56	17 49	29·84	59	60	o r	Slight N.N.W.
197	24 18	19 33	30·17	74	75	c	Rough N.E.
206	32 32	30 6 E.	29·86	82	81	b	Smooth.
208	42 31	13 57 W.	30·32	69	67	b c	—
210	53 45	56 30	29·98	52	—	b	—
215	43 42	10 56	30·29	64	67	o	Moderate.
216	0 55	29 30	30·05	79	78	c b	—
224	34 43	33 25	30·49	81	77	b c p	—
225	29 26	14 52	30·26	76	—	b c	—
227	St. John's, N.F.		29·99	54	53	b c q	*See* 268.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
228	Halifax, N.S.		30·23	60	—	b c	—
231	Gibraltar		30·08	72	—	b c	*See* 242, 247, 259, & 269.
232	37 35 N.	0 56 W.	—	86	—	b c	—
236	Bantry Bay		29·81	59	—	c q	—
237	Queenstown		29·67	57	—	b c q	—
238	Plymouth Sound		29·79	60	—	c p q	*See* 256, 258, and 265.
240	Bridgetown, Barbadoes		29·96	82	—	b c	—
242	Gibraltar		30·09	79	—	b c	—
243	25 45	82 10	30·11	84	85	b c	—
244	Elmina, W.C. Africa		30·05	79	—	c	*See* 253, 254, 257, 260, and 262.
245	Port Cortez, Honduras		30·01	81	—	b c	—
247	Gibraltar		30·14	72	—	b c	—
248	43 58	63 45	30·28	62	—	b c	—
250	Port Royal, Jamaica		29·95	80	—	b c	—
253	Secondee, W.C. Africa		—	74	—	b c	—
254	5 3	1 18	30·11	81	—	b c	—
255	36 11	7 52	30·17	70	70	b c	—
256	Plymouth Sound		29·74	59	—	—	—
257	Dix Cove, W. C. Africa		30·04	75	—	c	—
258	Plymouth Sound		29·81	61	—	b c q	—
259	Gibraltar		30·12	75	—	b c	—
260	Cape Coast Castle, W. C. Africa.		30·13	76	76	o	—
261	North Shields		29·42	61	—	b c	—
262	Cape Coast Castle, W. C. Africa.		30·03	76	72	c	—
265	Plymouth Sound		29·85	63	—	b c p	—
266	27 18	75 20	30·20	83	84	b c	—
267	35 44	64 38	30·29	73	78	b c	—
268	St. John's, N.F.		30·03	64	—	b c	—
269	Gibraltar		30·06	73	—	b c	—
271	19 9	30 46	—	—	—	dry	—
272	15 49	29 9	—	—	—	p	—
273	12 39	26 4	—	—	—	clear	—
275	45 5	60 50	—	—	—	fine	—
276	41 38	50 53	—	—	—	fine	Smooth.
277	49 20	42 0	—	—	—	c	—
278	64 30	64 30	29·64	34	33	o m	—
279	Nassau, New Providence		30·19	85	85	c b	—
280	40 40	27 20 E.	—	—	—	fine	—
281	43 15	53 20 W.	—	—	—	fine	—
282	30 31	63 31	30·29	79	79	c	—
284	19 21	52 36	—	82	81	b	—
286	22 50	61 10	30·23	82	82	b	—
287	11 50	77 35	29·93	84	84	b	—
289	1 19	0 43 E.	29·99	81	—	—	—
290	Goree, W.C. Africa		—	86	—	—	—
						Wind. Dir. Force.	
11 A.M. 2 P.M.	St. Louis, Senegal		30·01 30·00	83 85	— —	S.W. 3 W. 4	— —

AUGUST 30, 1873.

No. of Log.	Position.		Barometer.	Temperatures.		Weather.	State of Sea, &c.
	Latitude.	Longitude.		Air.	Sea.		
	° ′	° ′	Ins.	°	°		
1	2 23 N.	26 19 W.	30·07	81	—	fine	—
3	43 34	33 56	29·88	79	—	c	Nasty cross.
9	42 52	60 58	30·03	—	—	fine and clear	Smooth.
10	54 4	28 8	—	—	—	fine	—
23	38 51	60 9	—	—	—	fine	—
28	18 20	30 21	—	—	—	c	—
31	Pictou Harbour, N.S.		—	—	—	fine	—
32	41 44	66 39	30·21	62	57	—	Smooth.
33	51 10	16 12	29·80	59	58	r o	—
36	48 47	33 20	29·77	63	—	fine and clear	—
39	54 4	45 1	—	—	—	c	—
40	45 21	54 22	—	—	—	m	—
41	34 27	13 41	30·25	—	—	b c	Nly.
45	1 28	12 44	30·04	81	—	o q	Smooth.
46	47 22	17 8	30·02	67	—	c	—
47	50 45	0 50 E.	—	68	—	b c	*See* 198.
50	16 27	53 58 W.	30·06	—	—	p	—
53	13 30	60 8	30·02	—	—	b c	—
55	48 58	28 50	29·82	58	60	c	—
56	41 41	55 20	30·29	70	72	fine	—
59	40 39	72 10	30·07	66	68	c p	—
61	42 55	48 27	30·06	63	—	fine	—
63	50 50	13 17	29·92	60	59	m	—
66	52 41	5 51	29·88	66	62	clear	—
67	42 47	54 1	30·13	62	70	clear	—
68	49 37	60 22	29·82	53	50	fine and clear	—
69	50 31	41 11	29·92	58	62	c	—
70	48 50	67 33	? 29·81	61	54	m	—
73	49 6	61 39	29·86	55	—	b c	—
78	49 31	20 11	29·74	70	—	m	—
80	46 10	58 14	—	—	—	m	—
82	21 51	61 42	30·24	80	—	m	—
84	39 53	69 53	—	73	—	c	—
87	34 23	40 11	—	—	—	c q r	—
88	37 11	71 37	—	—	—	fine	—
93	40 17	66 8	30·28	66	64	fine	Smooth.
94	41 9	66 44	30·09	63	63	fine	—
95	50 48	20 23	—	—	—	r	—
98	40 34	69 31	30·22	60	65	c	—
100	46 1	38 50	29·88	66	64	c	—
101	50 36	24 52	? 29·76	62	60	m r	—
102	50 56	14 18	—	—	—	m	Wly.
103	49 2	63 12	—	—	—	m	—
109	48 17	20 38	—	—	—	c	—
110	37 4	32 15	—	78	—	c	—
113	5 0	6 0	—	—	—	c	—
131	0 20	28 44	—	—	—	c	—
133	35 26	11 48	—	—	—	fine	High N.N.Ely.
134	24 19	20 15	—	—	—	c	High N.N.Ely.

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
139	1 42 N.	22 45 W.	—	—	—	clear	—
142	31 30	64 50	—	—	—	fine	—
150	14 44	32 25	—	—	—	d	—
151	48 32	8 7	—	—	—	c	—
152	Bonny, W. C. Africa		—	—	—	c r	—
153	4 32	9 23	—	—	—	fine	—
155	49 9	7 40	—	—	—	m	Heavy.
156	6 24	3 26 E.	—	—	—	fine	—
157	19 2	18 32 W.	—	—	—	fine and clear	—
162	29 55	74 50	30·26 5 P.M.	—	—	fine	—
164	44 59	61 16	30·13 4 P.M.	63	—	fine	W.S.Wly. rising.
166	42 10	35 37	—	—	—	fine	—
171	42 41	38 11	—	—	—	clear	—
178	Newcastle, England		—	63	60	c	See 261.
179	46 37	17 15	30·08	68	65	c	Long W.N.Wly. swell.
180	55 26	14 54 E.	29·76	62	—	c b p	—
181	47 37	18 49 W.	29·94	67	64	c	Moderate.
182	55 2	16 0	29·66	56	56	c p m	Heavy swell.
183	52 20	76 13	30·27	81	—	b c	—
185	47 16	20 7	29·97	68	64	o	Heavy N.N.E. & N.N.W.
186	8 18	21 35	30·08	85	81	b c	Confused swell.
188	24 15	73 46	30·23	85	84	b c	E.S.Ely. swell.
194	58 38	49 54	29·92	47	47	c m	Short E.
195	43 35	48 53	30·17	65	62	b	Smooth.
196	50 25	24 26	29·72	59	60	o r	Smooth.
197	21 29	19 40	30·08	76	78	o g	Moderate N.E.
198	30 46	0 30 E.	29·79	68	64	c	Moderate.
206	31 54	31 20	29·90	80	81	b	Smooth.
208	41 34	14 39 W.	30·32	73	70	b c	Long W.N.Wly. swell.
210	53 50	56 50	29·75	64	—	c	—
214	41 28	12 37	30·29	69	69	b c	Long rolling W.N.Wly. swell.
215	42 2	11 40	30·27	68	68	b c	Smooth.
216	0 8	30 17	30·10	80	78	b c	Smooth.
224	35 35	32 21	30·39	75	76	b c	—
225	31 10	13 11	30·17	74	—	b c	—
227	St. John's, N.F.		30·09	55	53	b	See 268.
228	Halifax, N.S.		30·12	57	—	c	See 248.
231	Gibraltar		30·15	72	—	b c	See 242, 247, 255, 259, and 269.
232	Escombrera Bay, Spain		—	84	—	b c	—
237	51 12	8 50	29·66	60	—	m d f	—
238	Plymouth Sound		29·78	69	—	b c	See 256, 258 and 265.
240	Bridgetown, Barbadoes		30·05	80	—	b c p q	—
242	Gibraltar		30·15	73	—	b c	—
243	23 15	81 45	30·06	81	84	b c p	—
244	Elmina, W. C. Africa		30·08	82	—	b c	See 253, 254, 257, 260, and 262.
245	Port Cortez, Honduras		29·98	81	—	c r l t	—
247	Gibraltar		30·15	75	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
248	Halifax, N.S.		30·21	60	—	c	—
250	Port Royal, Jamaica		30·05	81	—	b c	—
253	Secondee, W. C. Africa		—	—	—	b c	—
254	Elmina, W. C. Africa		30·10	82	—	b c	—
255	Gibraltar		30·16	74	76	b c	—
256	50 20 N.	4 25 W.	29·72	64	—	b c	—
257	Dix Cove, W. C. Africa		30·06	75	—	b c	—
258	50 12	4 27	29·77	64	—	b c v	—
259	Gibraltar		30·16	72	—	b c	—
260	4 58	1 35	30·15	78	77	b c	—
261	North Shields		29·57	64	—	b c	—
262	Cape Coast Castle, W. C. Africa		29·94	77	75	b c	—
265	50 12	4 24	29·79	63	—	b c	—
266	25 50	76 50	30·21	81	83	b c	—
267	38 5	64 34	30·32	74	79	b c	—
268	St. John's, N.F.		30·13	60	—	b c	—
269	Gibraltar		30·08	76	—	b c	—
271	21 36	32 32	—	—	—	c and dry	—
272	15 3	29 51	—	—	—	fine and clear	—
273	14 10	26 8	—	—	—	clear	—
275	Sydney, New Brunswick		—	—	—	fine	—
276	42 47	47 37	—	—	—	fine	Smooth.
277	46 5	43 15	—	—	—	fine	—
278	64 36	64 50	29·71	35	—	m	—
279	Nassau, New Providence		30·22	83	85	c b	—
280	Constantinople		—	—	—	fine	—
281	41 40	54 30	—	—	—	fine	Smooth.
282	30 58	63 18	30·25	80	80	c b	—
284	18 40	55 10	—	82	81	b c	—
286	25 45	57 35	30·21	83	82	c b	—
287	9 45	79 30	29·96	83	82	o r	—
289	2 22	0 54	29·96	75	—	—	—
290	Goree, W. C. Africa		—	84	—	—	—
						Wind. Dir. Force.	
11 A.M. 2 P.M.	St. Louis, Senegal		29·97 29·93	84	—	W.N.W. 5 W.N.W. 5	— —

AUGUST 31, 1873.

1	4 49 N.	25 52 W.	30·09	81	—	fine	—
3	42 48	34 29	—	71	—	clear	—
7	40 34	70 2	30·07	—	—	clear	—
8	44 13	58 28	?29·96	57	51	f d	—
9	41 23	65 50	29·76	—	—	m f	—
10	54 53	21 46	?29·68	—	—	r	—
23	40 29	55 47	—	—	—	—	—
28	21 59	30 34	—	—	—	fine and clear	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
31	Pictou Harbour, N.S.		—	—	—	fine	—
32	40 30 N.	73 27 W.	30·01	70	66	m	—
33	50 47	24 11	29·74	58	58	c	—
36	50 10	26 27	29·76	61	62	c	—
37	40 41	68 41	30·02	66	63	m	—
39	54 57	39 28	—	—	—	m	E.N.Ely. swell.
40	46 23	56 15	?29·84	—	—	f	—
41	30 34	15 43	30·17	—	—	b c	Light Nly.
46	48 27	11 30	—	—	—	c	—
49	4 39	30 0	30·04	—	—	fine	—
50	13 54	37 58	30·13	—	—	o	—
51	35 49	10 54	30·19	—	—	fine	—
53	14 19	37 49	29·98	—	—	c	—
55	50 25	21 16	—	57	60	fine	—
56	42 38	48 44	30·07	69	69	fine	—
60	51 47	8 13	—	—	—	c	—
61	44 40	42 44	30·01	70	72	clear	—
63	50 7	18 20	29·87	60	59	c	Heavy W.S.Wly. swell.
67	42 43	60 1	29·91	64	62	f	—
68	49 17	66 22	29·80	52	46	clear	—
69	52 19	33 49	29·93	56	55	clearing off	Smooth.
73	51 0	37 20	29·57	45	39	f	—
78	50 29	14 54	29·81	71	—	clear	—
80	44 23	54 36	—	—	—	p	—
82	23 4	63 38	30·19	84	—	q 1 l	—
84	38 53	74 35	—	86	—	f	—
87	35 22	38 51	—	—	—	c	Short tumbling W.N.W. swell.
88	38 6	68 23	—	—	—	clear	—
93	40 32	72 15	30·02	65	60	m	—
95	50 11	25 39	—	—	—	q r	—
97	40 41	60 23	30·00	70	69	m	—
98	40 56	63 54	30·02	68	65	p	—
100	47 47	32 37	29·90	62	62	clear	—
101	51 2	18 0	?29·74	68	62	clear	—
102	50 40	21 27	—	—	—	clear	Wly.
103	48 44	64 54	?29·77	—	—	q	—
109	48 42	16 16	—	—	—	c m	—
110	38 13	28 33	—	77	—	q	—
113	4 4	7 30	—	—	—	c	—
131	4 1	28 6	—	—	—	fine	—
133	37 38	10 19	—	—	—	fine	High N.N.Ely.
134	27 28	17 15	—	—	—	m	—
139	0 54	23 50	—	—	—	clear	—
150	15 46	33 3	—	—	—	hot and sultry	—
151	52 5	5 50	—	—	—	f	—
152	5 45	5 5 E.	—	—	—	—	Rising.
153	6 18	10 50 W.	—	—	—	hot and sultry	—
156	5 46	5 4 E.	—	—	—	fine	—
157	15 30	17 48 W.	—	—	—	o	—
162	30 42	74 20	—	—	—	fine	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
164	44 4 N.	63 51 W.	29·90	64	—	f r	—
166	43 48	22 46	—	—	—	c	—
168	48 10	60 45	—	—	—	clear	—
171	43 33	55 45	—	—	—	clear	—
178	Off Hasboro' Light 52 49	1 32 E.	29·85	63	63	b c	—
179	47 59	13 16 W.	29·94	66	62	c	Long W.N.Wly. Short E.N.Ely.
181	48 39	13 41	29·84	65	61	o d	Moderate W.S.Wly.
182	55 13	10 56	29·55	56	56	o r m	Heavy Ely.
183	32 41	75 7	30·18	79	82	c d	Confused.
185	48 45	17 13	29·85	63	62	c b m	Heavy W. swell.
186	8 58	21 16	30·10	81	80	b c	Light N.N.Ely. swell.
188	25 38	73 14	30·22	84	84	b m	—
190	40 36	69 0	30·28	67	63	m	Very smooth.
194	58 17	49 56	29·78	47	47	o r	Heavy S.Ely.
195	42 0	55 43	30·08	66	61	o r	Smooth.
196	49 5	30 34	29·83	58	61	c p	Slight W.N.W.
197	18 26	20 3	30·00	79	79	b c	Moderate N.E.
198	49 18	3 20	29·97	66	61	o r	High.
206	Port Said, Egypt		29·86	82	84	b	Smooth.
208	41 8	14 39	30·27	73	71	b	Very smooth.
210	53 50	56 50	29·50	69	—	o	—
214	40 14	13 21	30·26	72	71	b c	Smooth.
215	40 40	12 44	30·24	71	69	b	W.N.Wly. swell.
224	36 55	30 38	30·39	76	75	b c	—
225	32 40	13 1	30·07	78	—	b c	—
227	St. John's, N.F.		29·74	61	54	b c q	*See* 268.
228	Halifax, N.S.		29·82	67	—	b c	*See* 248.
231	Gibraltar		30·17	71	—	b c	*See* 242, 247, 255, 259, and 269.
232	Escombrera Bay, Spain		—	85	—	—	—
238	50 16	2 57	29·88	62	—	o m d	—
240	Bridgetown, Barbadoes		30·04	78	—	o r l f	—
242	Gibraltar		30·10	73	—	b c	—
243	Matanzas, Cuba		30·12	83	—	b c	—
244	Elmina, W. C. Africa		30·10	82	—	b c	*See* 253, 254, 257, & 262.
245	Port Cortez, Honduras		30·02	80	—	b c	—
247	Gibraltar		30·18	74	—	b c q	—
248	Halifax, N.S.		30·01	59	—	b c	—
250	Port Royal, Jamaica		30·03	80	—	b c	—
253	Secondee, W.C. Africa		—	—	—	b c	—
254	Cape Coast Castle, W. C. Africa		30·08	82	—	b c	—
255	Gibraltar		30·07	73	—	b	—
256	49 37	6 52	29·99	66	—	b c	*See* 258 and 265.
257	Dix Cove, W. C. Africa		30·10	76	—	b c	—
258	49 40	6 56	29·90	64	—	b c m	—
259	Gibraltar		30·17	74	—	b c	—
260	4 54	2 19	30·17	76	81	b c	—
261	53 48	0 6 E.	29·84	63	—	b c	—
262	Cape Coast Castle, W. C. Africa		30·01	78	74	c	—
265	49 38	6 59 W.	29·91	65	—	b c	—

No. of Log.	Position. Latitude.	Position. Longitude.	Barometer.	Temperatures. Air.	Temperatures. Sea.	Weather.	State of Sea, &c.
	° ′	° ′	Ins.	°	°		
266	Nassau, New Providence		—	83	—	b c	*See* 279.
267	40 20 N.	64 49 W.	30·12	69	72	c	—
268	St. John's, N.F.		29·81	64	—	b c	—
269	Gibraltar		30·08	74	—	b c	—
271	23 59	33 11	—	—	—	fine and dry	—
272	16 26	29 47	—	—	—	c	—
273	14 30	26 49	—	—	—	clear	—
276	42 56	44 58	30·09	—	—	fine	—
277	45 54	42 47	—	—	—	c	—
278	65 0	67 0	29·71	35	54	b	Smooth.
279	Nassau, New Providence		30·21	84	85	c	—
280	44 22	36 3 E.	—	—	—	c	—
281	41 50	56 25 W.	—	—	—	q	—
282	32 20	63 17	30·21	76	77	b c	—
284	18 0	57 45	—	83	82	c b	—
286	28 15	54 40	30·14	81	81	b c	—
289	2 53	1 5	30·04	77	—	—	—
290	Goree, W. C. Africa		—	84	—	—	—
						Wind. Dir^{n}. Force.	
11 A.M.	St. Louis, Senegal		29·95	83	—	S.W. 3	—
2 P.M.			29·89	86	—	W. 3	—

APPENDIX B.

Wind Observations on Pike's Peak, Colorado, compared with those on Mount Washington, from July 1874 to June 1875.

Throughout this work for August 1873 the observations on Mounts Mitchell and Washington have been plotted on the Charts, but unfortunately those on Pike's Peak, Colorado, in 38°48′ N., 104° 59′ W., and 14,216 feet above the sea (see Diagram 1 for its position), were not then commenced. The report of the Chief Signal Officer, United States Army, gives the number of wind observations at that station for each octant of the compass in each month, from July 1874 to June 1875 inclusive, and for each quarter of the year.* From them the following percentages have been calculated, as there is a special interest in having observations from so great a height, and it is probable that the winds of August 1874 resemble to a certain extent those of August 1873.

Pike's Peak.

Direction of Wind.	August 1874.			Percentage of Observations on each Point.				
	Percentage of Observations on each Point.	Speed per Hour.		Spring.	Summer.	Autumn.	Winter.	Year.
		Mean.	Greatest.					
		Miles.	Miles.					
North - -	3	16	36	11	4	26	11	13
N.E. - -	3	11	18	6	10	5	0	5
East - -	7	9	12	0	5	3	0	2
S.E. - -	4	19	28	0	4	1	0	1
South - -	22	16	40	1	15	9	7	8
S.W. - -	33	17	40	29	32	23	18	26
West - -	18	22	50	26	18	20	46	27
N.W. -	9	14	28	27	11	13	15	17
Calm - -	1	—	—	0	1	0	3	1

It will be seen that the percentages of the various winds in August 1874 agree very well with those of the summer quarter.

The Observer-Sergeant in charge of the station makes the following remarks on the wind and weather of August 1874.

"August, like the preceding summer months, was chiefly remarkable for numerous local storms,

* There were three observations daily; they were taken at 7.35 a.m., 4.35 p.m., and 11 p.m. Washington time, all of these observations have been used in calculating the percentages and rates of speed in the Table. The speed of the wind in August 1874 has been obtained from the Daily Bulletin of the Signal Service, U. S. Army.

" though they were of less severity than those of June and July. Thunder storms occurred on " twelve different days, the majority of them passing below the summit. Rain, hail, and snow often " fell in succession, during one and the same storm. Quite a heavy snow storm occurred on the 13th. " Light to brisk winds predominated; fresh gales prevailed on the 4th, 10th, 18th, 25th, and 31st, " but they were all of short duration."*

Two of the above-named gales were from S.W. and veered to W.

One	,,	,,	was from	W.	,,	,, N.W.
,,	,,	,,	,,	,,	,,	backed to S.W.
,,	,,	,,	,,	S.	and veered to S.W.	

The table on p. [88] shows that winds from S.W. prevail in spring and summer, and hold the second place in frequency during the rest of the year. In autumn north, and in winter west winds prevail.

N.E., E., S.E., S., and S.W. winds are more frequent in summer than in any other quarter of the year.

West, N.W., and North winds, are less frequent in summer than in any other quarter of the year. The Wly. winds of August 1874 were stronger at 7.35 a.m., than at the other hours of observation, and all the gales but one were reported at that hour. The Wly. winds were lightest at 4.35 p.m.

In June 1874. The Observer-Sergeant remarks :—

" I have closely watched the beginnings and progress of the local storms which were so frequent during the latter part of May,† and not uncommon during June, and have found that the great majority of them originated over the extensive parks West, S.W., and N.W. of this Peak; and dividing it from the main range. The lower strata of air become powerfully heated, and are probably (at this season of the year when the surrounding mountains discharge their melting snows into the parks) heavily charged with moisture. The usual cold heavy west winds descending the eastern slope of the

* The following remark by the Observer-Sergeant does not relate to our August work, but it bears so interestingly on the action of the air in cyclonic storms, that it has been thought right to quote it here :

"June 2nd, 1874. At 2.30 p.m., storm clouds advanced with a violent whirling motion from a point South and East of the summit, and close over the mountains surrounding the Peak in that direction. The vortex crept slowly along the En. slope of the Peak, and the clouds were hurrying towards it from all directions; thus over the summit they moved from the W. and N.W., south of the summit from S.W. and S.E. and north of it from N.E. and N., the whole revolving 'against the sun.' At the same time the clouds had a strong downward tendency, while from the centre of the vortex dense whitish masses of vapour poured upward like volumes of smoke. Thunder and lightning accompanied the storm, and heavy showers of sleet fell on the summit. The wind during and after the storm blew steadily and briskly from the west. At night the weather cleared up, but continuous silent lightning illuminated the entire En. horizon."

Here was an observer *above* and on the Wn. side of a cyclonic wind, where the clouds had a *downward* movement, whilst above its centre he saw dense masses of vapour *rising*. This seems to support the theory that there is an upward current of air at the centre of a cyclonic wind, and that the W. and N.Wly. winds of a cyclonic system in the Northern Hemisphere are partially downward rushes of air.

† The first thunder storm of the year occurred on May 11; between the 18th and 31st of May they were of almost daily occurrence, generally advancing from S.W. to N.E. and passing above and below the summit; from the 8th May to the end of the month more or less sleet fell nearly every day, the weather generally clouding up towards noon and clearing in the evening. Atmospheric electricity made itself frequently and uncomfortably felt by discharging through stove and lightning-arrester. July 16th. The Sergeant says: "In spite of the cap I wore, my scalp appeared to be pricked with hundreds of red-hot needles, and a burning sensation was felt on face and hands during a very severe thunder storm."

main range, and wedging under the heated, moist, lower strata, might explain the frequency of our local storms during the hottest part of the day."

The following are the percentages of upper cloud observations on Pike's Peak during August 1874; there were only 38 observations in the month. S. 5 °/₀, S.W. 40 °/₀, West 42 °/₀, N.W. 13 °/₀. Hence whilst the table on p. [88] shows that nearly 70 °/₀ of the winds for the year are from S.W., W., or N.W., the above figures show that a still larger percentage of upper clouds moved from the same quarters during August 1874. These observations on Pike's Peak therefore show that there is a pretty constant current of air flowing from the W.d. which extends to a great height above the summit of the Peak, but that no upper clouds were seen to move from the Est. half of the compass in August 1874.

For the sake of comparison with the preceding table of observations on Pike's Peak, the following table is given; it contains the corresponding observations on Mount Washington for the same year, viz., from July 1874 to June 1875 inclusive. As in the preceding table, all percentages, and the speed of the wind during August 1874, are from observations made three times a day.

MOUNT WASHINGTON.

Direction of Wind.	August, 1874.			Percentage of Observations on each Point.				
	Percentage of Observations on each Point.	Speed per Hour.		Spring.	Summer.	Autumn.	Winter.	Year.
		Mean.	Greatest.					
		Miles.	Miles.					
North - -	19	15	36	26	16	30	15	22
N.E. - -	6	12	32	3	4	0	1	2
East - -	7	10	32	3	3	1	0	2
S.E. - -	1	9	10*	5	3	6	0	3
South - -	4	30	44	4	6	3	0	3
S.W. - -	4	26	38	6	9	6	9	8
West - -	7	25	48	7	12	9	11	10
N.W. - -	49	36	75	42	45	42	64	48
Calm - -	3	—	—	4	2	3	0	2

The above table shows that N.Wly. winds prevailed at Mount Washington throughout the year, but more especially in the winter, then came the Nly., and thirdly the Wly. winds. The N.Wly. winds had also much the greatest speed in August. Besides two N.Wly. gales of 75 miles an hour, there were three others, having a speed of 70 to 72, and six from 60 to 65 miles an hour.

Nly. winds were more common in Autumn than in any other quarter of the year, though they were nearly as frequent in spring.

The largest number of Wly. winds having a speed of 40 miles an hour or upwards were recorded at 11 p.m.

* Here it may be well to say that on the 14th August 1873 there was a S.E. gale of 60 miles an hour which lasted from 4.37 to 11 p.m., Washington time, but it does not appear on the Chart, as the wind was N.E. at the time of the Chart. There was also another S.E. gale on the 18th August 1873, but that is mentioned in the remarks for that day.

There were only 43 observations of the motion of upper clouds recorded on Mount Washington during August 1874, their percentages are as follows:—

N. 11 %; N.E. 12 %; E. 5 %; S.E. 5 %; S. 2 %; S.W. 7 %; W. 12 %; N.W. 46 %; so that not only at Mount Washington but at a great height above that station the N.Wly. current of air prevailed during August 1874.

With the object of finding the differences between the summer and winter forces of the various winds at Pike's Peak and Mount Washington, and also the relative forces of the winds of those stations at the same season, the data for January 1874, given in the Daily Bulletin of the Signal Service U.S. Army, have been worked up and produce the following results:

JANUARY 1874.

Direction from which Wind and Clouds moved.	Pike's Peak.				Mount Washington.			
	Wind. Per-centages.	Mean velocity. Miles per Hour.	Greatest velocity. Miles per Hour.	Clouds. Per-centages.	Wind. Per-centages.	Mean velocity. Miles per Hour.	Greatest. velocity. Miles per Hour.	Clouds. Per-centages.
North - -	6	24	40	2	1	52	52	—
N.E. - -	—	—	—	—	—	—	—	—
East - -	—	—	—	—	—	—	—	—
S.E. - -	—	—	—	—	3	37	62	—
South - -	—	—	—	—	1	15	15	—
S.W. - -	14	18	30	10	24	47	80	50
West - -	43	24	50	51	12	49	108	—
N.W. - -	37	25	50	37	58	50	126	50
Calm - -	—	—	—	—	1	—	—	—

Comparison of the Observations at Pike's Peak in January and August.

The above figures, compared with similar data for August, show that on PIKE'S PEAK, Wly. and N.Wly. winds had a higher percentage and velocity in January than in August; also that Sly. winds, which had 22 % in August, were not experienced in January, and that S.Wly. winds had a lower percentage, with about the same velocity as in August. In January, as in August, strong Wly. winds were much more frequent at 7.35 a.m. than at the other hours of observation. Nearly all the upper cloud observations on Pike's Peak in January were from some WN. quarter; the previous remarks show that this was also the case in August.

Comparison of the Observations on Mount Washington in January and August.

MOUNT WASHINGTON had a higher percentage and much higher velocity of S.Wly., Wly., and N.Wly. winds in January than in August, whilst Nly. winds, which had 19 % in August, had only 1 % in January. The mean velocities of S.W., W., and N.W. winds were much higher in January than in August, amounting to the speed of a strong gale, whilst their extremes are respectively 80, 108, and 126. There are eleven observations of N.Wly. winds having a velocity of 80 miles an hour, or upwards, during January.

In January, as in August, strong Wly. winds were more frequent at 11 p.m. than at the other hours of observation.

There were only ten observations of upper cloud motion at Mount Washington in January; they were divided equally between S.W. and N.W.

Comparison of January Winds at Pike's Peak and Mount Washington.

The above table shows that both the mean and extreme forces of S.Wly., Wly., and N.Wly. winds in January were about twice as great at Mount Washington as at Pike's Peak; their difference is not quite so great in August. No doubt the Rocky Mountain Range to the westward of Pike's Peak interferes with the force of the Wly. winds on that Peak.

The above facts seem to show that whatever the forces may be which are at work to cause the strong winds on these mountain tops in August, they are much intensified in January, and as has been already said, are no doubt related to the heavy Wly. gales of winter which blow in the northern part of the North Atlantic. It is hoped that this work may have thrown some light on this important subject, and that the causes of these strong Wly. upper currents, and of their several variations, will soon be discovered.

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